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LAKE MARK DAM (CT 003.. (U) CORPS OF ENGINEERS WALTHAM
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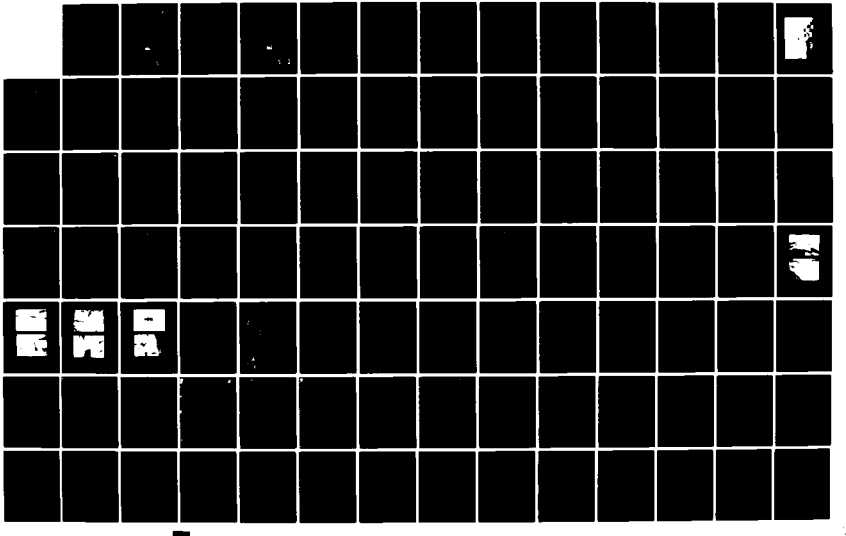
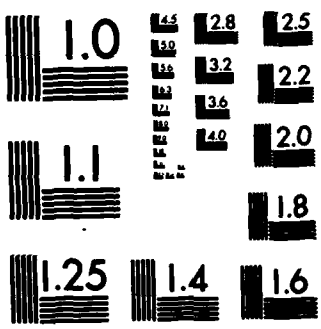




THAMES RIVER BASIN

STAFFORD, CONNECTICUT

LAKE MARK DAM
CT 00337

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

AUGUST 1980

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

NOV 14 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Lake Mark Dam (CT-00337) Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Mr. Michael Molitoris, Stafford, Conn.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Division Engineer

Incl
As stated

THAMES RIVER BASIN

STAFFORD, CONNECTICUT

LAKE MARK DAM
CT 00337

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

AUGUST 1980

BRIEF ASSESSMENT

PHASE I INSPECTION REPORT

NATIONAL PROGRAM OF INSPECTION OF DAMS

Name of Dam:	LAKE MARK DAM
Inventory Number:	CT 00337
State Located:	CONNECTICUT
County Located:	TOLLAND
Town Located:	STAFFORD
Stream:	DIAMOND LEDGE BROOK
Owner:	MICHAEL MOLITORIS
Date of Inspection:	MARCH 31, 1980
Inspection Team:	PETER M. HEYNEN, P.E.
	MURALI ATLURU, P.E.
	MIRON PETROVSKY
	JAY A. COSTELLO

The dam, substantially completed in 1957 and certificate of approval dated April 27, 1972, consists of an earth embankment with a concrete corewall and a concrete spillway. The embankment is 580 feet long, has a maximum storage capacity of 185 acre-feet, and is 22 feet in height above the streambed of Diamond Ledge Brook at the toe of the dam. The top of the dam (elevation 21.0) is 20 feet wide and 6 feet above the spillway crest. The upstream slope and top of the dam have a sod cover except at the left end where there is a sandy beach area. The spillway consists of a 10 foot long and 3 foot wide broad-crested concrete weir and a rectangular chute (fish ladder) which extends 65± feet to the toe of the dam. The low-level outlet facility is an 8 inch corrugated metal pipe which is encased in concrete and located to the left of the spillway and gated at the downstream slope.

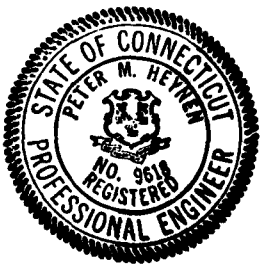
Based upon the visual inspection at the site and past performance of the dam, the project is judged to be in fair condition. There are items requiring maintenance and monitoring such as seepage along the toe of the dam, cracking along the joints of the spillway chute, and the lack of proper slope protection. Also, the fill being dumped along the downstream slope should be graded to a lesser slope and slope protection placed.

In accordance with the Army Corps of Engineers' guidelines, Lake Mark Dam is classified as a significant hazard, small size dam. The test flood range to be considered is from the one hundred year flood to one-half the Probable Maximum Flood (1/2 PMF). The test flood for Lake Mark Dam is equivalent to the 1/2 PMF. Peak inflow to the lake at the test flood is 840 cubic feet per second (cfs) and peak outflow is 545 cfs with the dam overtopped by 0.2 feet. The spillway capacity with the lake level to the top of the dam is 440 cfs, which is 81% of the routed test flood outflow.

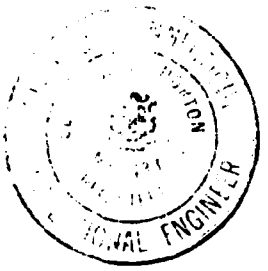
It is recommended that the owner retain the services of a registered professional engineer qualified in dam design and inspection to analyze in more detail the adequacy of the existing project discharge. Other items of importance are inspection of the spillway and intake structure when the lake is drained, the origin and significance of seepage at the toe of the dam, replacing the CMP outlet and the feasibility of gating the outlet pipe at the upstream side of the dam. Recommendations should be made by the engineer and implemented by the owner.

The above recommendations and further remedial measures which are discussed in Section 7, should be instituted within 1 year of the owner's receipt of this report.

Peter M. Heynen, P.E.
Project Manager - Geotechnical
Cahn Engineers, Inc.



C. Michael Horton, P.E.
Department Head
Cahn Engineers, Inc.



This Phase I Inspection Report on Lake Mark Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

RICHARD DIBUONO, CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspection. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam would necessarily represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions will be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions there of. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as neccessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

The information contained in this report is based on the limited investigation described above and is not warranted to indicate the actual condition of the dam. The integrity of the dam can only be determined by a means of a monitoring program and/or a detailed physical investigation. The accuracy of available data is assumed where not in obvious conflict with facts observable during the visual inspection.

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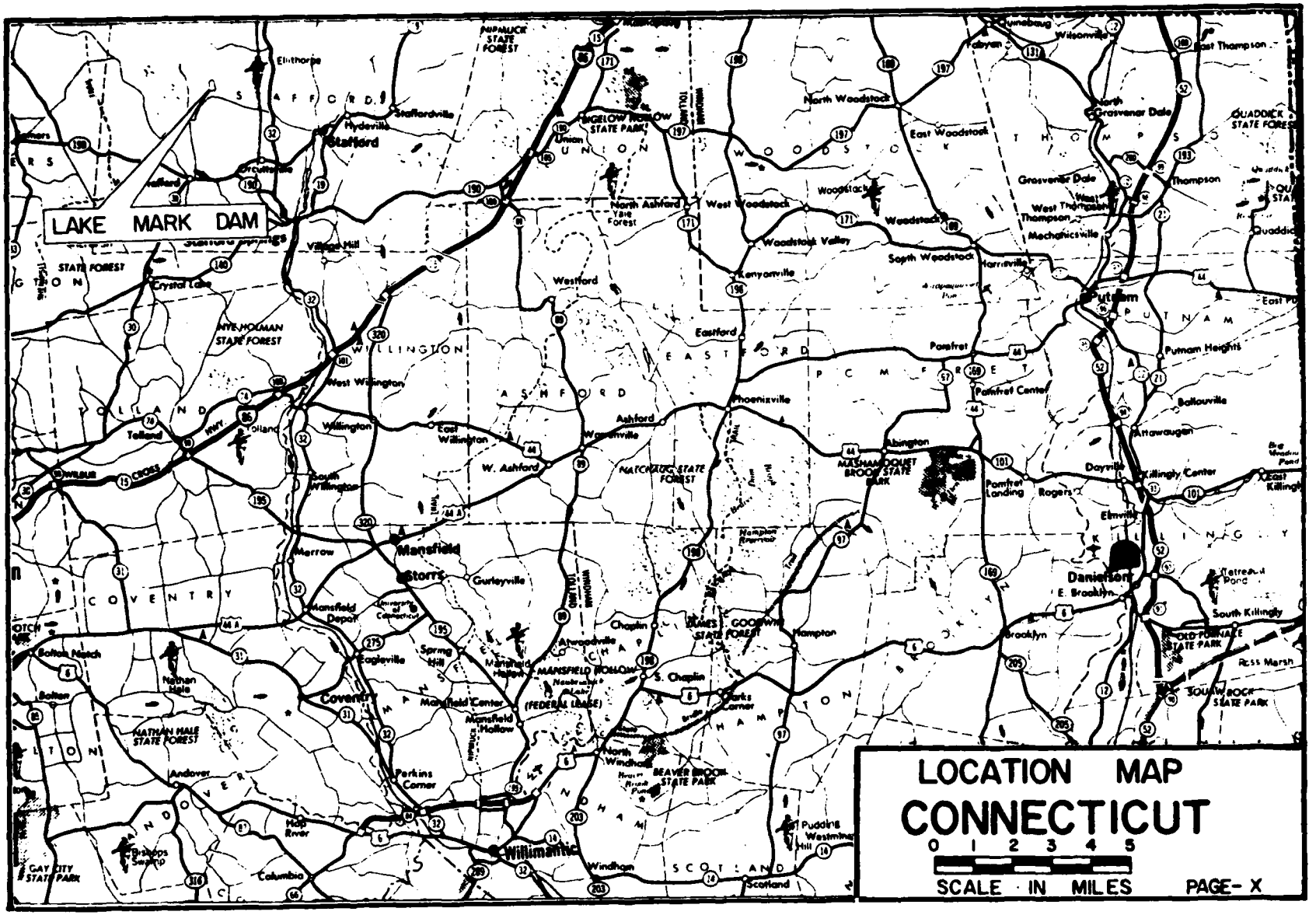
APPENDICES

OVERVIEW PHOTO
(February 1980)

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Lake Mark Dam	Stafford	DATE Aug 1980
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED DAMS	Diamond Ledge Brook	CONNECTICUT	CE #27 785 KD PAGE ix


LAKE MARK DAM
LOCATION MAP
CONNECTICUT
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SCALE IN MILES
PAGE- X

PHASE I INSPECTION REPORT

LAKE MARK DAM

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Cahn Engineers, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Cahn Engineers, Inc. under a letter of April 14, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW 33-80-C-0052 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dam.

3. To update, verify and complete the National Inventory of Dams.

c. Scope of Inspection Program - The scope of this Phase I inspection report includes:

1. Gathering, reviewing and presenting all available data as can be obtained from the owners, previous owners, the state and other associated parties.

2. A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

3. Computations concerning the hydraulics and hydrology of the facility and its relationship to the calculated flood through the existing spillway.

4. An assessment of the condition of the facility and corrective measures required.

It should be noted that this report passes judgment only on those factors of safety and stability which can be determined by a visual surface examination. The inspection is to identify those visually apparent features of the dam which evidence the need for corrective action and/or further study and investigation.

1.2 DESCRIPTION OF PROJECT

a. Location - The dam is located on Diamond Ledge Brook, (Thames River Basin), in a rural area of the town of Stafford, County of Tolland, State of Connecticut. The dam is shown on the Monson (Mass. - Conn.) USGS Quadrangel Map having coordinates latitude N 42° 00.1' and longitude W 72° 21.0'.

b. Description of Dam and Appurtenances - The project is a recreational facility substantially completed in early 1957. The dam consists of an earth embankment, a concrete corewall, a concrete spillway section, and a low-level outlet.

The embankment is 580 feet in length, 20 feet wide at the top (elevation 21.0) and 22 feet in height above the streambed at the toe of the dam. The upstream slope is inclined at 3 horizontal to 1 vertical and covered with sod except for a small beach area at the left end of the dam. There are two concrete retaining walls along the upstream slope; one abutting each of the spillway wing walls. These retaining walls are 20 feet long, 8 inches wide, and 3 feet deep. The top of these walls are about 1 foot above the water line. Fill is being placed at the right and left end of the dam. This fill steepens the downstream slope and gradually widens the top of the dam for use as beach and parking areas. The top of the dam is 20 feet wide at the spillway and widens to more than 100 feet at the right end and 70± feet at the left end. The top of the dam is also covered with sod except for a parking area on the fill at the left end. The inclination of the downstream slope is 2 horizontal to 1 vertical at the spillway section and becomes steeper along the fill toward the ends of the dam. The downstream slope has a cover of weeds and brush at the right end and is ragged and unfinished at the left end (See photos 2 and 4). The corewall is of concrete construction and has a maximum height of 23 feet just to the right of the spillway. It is also 10 inches thick at the top (elevation 18.0), which is 3 feet below the top of dam, and 12 inches thick at the base. The centerline of the corewall is offset 5 feet upstream from the centerline of the top of the dam.

The spillway is located approximately 150 feet from the right abutment and consists of a 10 foot long by 3 foot wide broad-crested concrete weir (crest elevation 15.0) and a 65 foot long rectangular concrete chute. A piece of railroad track placed across the crest of the concrete weir raises the spillway crest 4½ inches (elevation 15.4) and allows 4.2 feet of clearance to a concrete slab over the spillway. The chute ranges in depth from 6 feet (bottom of fish trough) at the spillway crest to 5 feet at the downstream end. There are 12 foot long wing walls at the upstream end, 10 foot wing walls at the downstream end, and a fish ladder the length of the chute (See Sheet B-1). A concrete slab extends across the spillway to form a diving board platform and provide a means for easy access to all parts of the dam.

The low-level outlet is an 8 inch corrugated metal pipe which is encased in concrete and located just to the left of the spillway. The control is an 8 inch valve with a hand operated valve stem located in a concrete chamber on the downstream slope along the left wall of the spillway chute. The pipe extends through the apron at the base of the spillway chute and outlets in the discharge channel. The inlet rests on a concrete pad on the upstream slope of the embankment.

c. Size Classification - (Small) - The dam impounds 185 acre-feet of water with the lake level at the top of the dam, which at elevation 21.0, is 22 feet above the streambed at the toe of the dam. According to the Army Corps of Engineers' Recommended Guidelines, a dam with this size and storage capacity is classified as small in size.

d. Hazard Classification - (SIGNIFICANT) - If the dam were breached, there is potential for loss of less than a few lives and extensive property damage 11,600+ feet downstream at Route 190. There is at least one residence and one business situated less than 4 feet above the streambed in this area which would be inundated by 1+ feet. Also, there are several buildings, one of which is a residential structure, located just south of Route 190 which are expected to experience some flooding upon failure of the dam.

e. Ownership - Mr. Michael Molitoris
Diamond Ledge Road
Stafford, Connecticut 06075
Tel. (203)-684-2523

f. Operator - Owner (see Ownership, above)

g. Purpose - Recreation - The dam is drained between September and April. During the warmer months, the lake is used as a picnic and swimming facility.

h. Design and Construction History - The following information is believed to be accurate based on the plans and correspondence available. Authorization for construction was granted in February, 1953. The dam was designed by Buck and Buck Engineers of Hartford, Connecticut and constructed by the owner, Michael Molitoris. Construction time was 3 years and the dam was substantially completed and the lake filled in early 1957. The certificate of approval was not given until April, 1972.

i. Normal Operational Procedures - The low-level outlet is opened several times a year for an hour to blow out the silt around the inlet. In the fall, the valve is opened to drain the lake. The valve remains open until spring. During the warmer months, when the lake is full, the normal water level is at the spillway crest, elevation 15.4.

1.3 PERTINENT DATA

a. Drainage Area - 0.6 square miles of undeveloped, densely wooded, mountainous to rolling terrain located in the Thames River Basin.

b. Discharge at Damsite - Water is released over the spillway and through the 8 inch low-level outlet.

1. Outlet Works:

8 inch low-level outlet @ d/s invert el. -1.0:	13 cfs
2. Maximum flood at damsite:	Unknown
3. Ungated spillway capacity @ top of dam el. 21.0:	440 cfs
4. Ungated spillway capacity @ test flood el. 21.2:	460 cfs
5. Gated spillway capacity @ normal pool el.:	N/A
6. Gated spillway capacity @ test flood el.	N/A
7. Total spillway capacity @ test flood el. 21.2:	460 cfs
8. Total project discharge @ test flood el. 21.2:	545 cfs

c. Elevations (Based on spillway crest @ elevation 15.0)

1. Streambed at toe of dam:	-1.0
2. Maximum tailwater:	N/A
3. Upstream portal invert diversion tunnel:	N/A
4. Recreation pool:	15.4
5. Full flood control pool:	N/A
6. Spillway crest (ungated):	15.0 (concrete) 15.4 (top of metal rail)
7. Design surcharge (original design):	17.5

8. Top of dam:	21.0
9. Test flood surcharge:	21.2
d. Reservoir (Length in feet)	
1. Normal pool:	1600 ft.
2. Flood control pool:	N/A
3. Spillway crest pool:	1600 ft.
4. Top of dam:	1800 ft.
5. Test flood pool:	1800 ft.
e. Storage (acre-feet)	
1. Normal pool:	75 acre-ft.
2. Flood control pool:	N/A
3. Spillway crest pool:	75 acre-ft.
4. Top of dam:	185 acre-ft.
5. Test flood pool:	185 acre-ft.
f. Reservoir Surface	
1. Normal pool:	16 acres
2. Flood control pool:	N/A
3. Spillway crest:	16 acres
4. Top of dam:	19 acres
5. Test flood pool:	19 acres
g. Dam	
1. Type:	Earth Embankment
2. Length:	580 ft.
3. Height:	22 ft.
4. Top width	20 ft. (at spillway)
5. Side slopes:	3H to 1V (Upstream) 2H to 1V (Downstream)

6. Zoning:	N/A
7. Impervious Core:	Concrete Corewall
8. Cutoff:	N/A
9. Grout curtain:	N/A
10. Other:	N/A

h. Diversion and Regulatory Tunnel - N/A

i. Spillway

1. Type:	broad-crested concrete weir with concrete chute
2. Length of weir:	10 ft.
3. Crest elevation:	15.4 (Top of metal rail) 15.0 (Top of concrete weir)
4. Gates:	N/A
5. U/S channel:	earthfill
6. D/S channel:	natural streambed
7. General:	65 foot long rectangular concrete chute with fish ladder to toe of dam. Clearance from spillway crest to concrete slab over spillway is 4.2 feet.

j. Regulating Outlets

1. Invert (D/S):	-1.0
2. Size:	8 inch
3. Description:	Corrugated metal pipe encased in concrete, located left of spillway chute
4. Control mechanism:	8 inch valve with hand operated stem located in chamber left of spillway on d/s slope
5. Other:	N/A

SECTION 2: ENGINEERING DATA

2.1 DESIGN DATA

The available data consists of a drawing by Buck and Buck, Engineers and correspondence concerning dam inspections, available at the Connecticut Department of Environmental Protection. The drawings and correspondence indicate the design features stated previously in this report. There are no engineering values, assumptions, test results or calculations available other than the drawing mentioned above.

2.2 CONSTRUCTION DATA

The only available data concerning construction of the dam are inspection reports as listed in Appendix B. No information concerning considerations made during construction of the dam is available.

2.3 OPERATION DATA

Lake level readings are not taken at the dam. The lake is drained and the outlet left open from September to March. According to the owner, the dam spillway capacity has never been exceeded. No formal operation records are known to exist.

2.4 EVALUATION OF DATA

a. Availability - Existing data was provided by the owner and the State of Connecticut Department of Environmental Protection. The owner made the project available for visual inspection.

b. Adequacy - The limited amount of detailed engineering data available was generally inadequate to perform an in-depth assessment of the dam, therefore, the assessment of this dam must be based on visual inspection, performance history, hydraulic computations of spillway capacity and approximate hydrologic judgements.

c. Adequacy - A comparison of record data and visual observations reveals no significant discrepancies in the record data. However, the outlet pipe as seen during the inspection was not the same as the design plan indicates.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. The general condition of the dam is fair. Inspection revealed areas requiring maintenance and monitoring. At the time of the inspection the water level was at elevation 15.9, 5.1 feet below the top of the dam.

b. Dam

Top of Dam - The top of the dam shows no signs of misalignment, visible cracks or erosion (Photo 1). There is a small stream across the left side of the dam, which is caused by surface runoff from the surrounding terrain. The top has a sod cover except for the extreme left end, where there is an unpaved parking area. A concrete slab extends across the spillway. This provides easy access to all parts of the dam as well as providing a diving platform. The concrete appears to be in good condition.

Upstream Slope - The upstream slope has a sod cover and a 20 foot long and 3 foot high concrete retaining wall abutting each of the spillway wingwalls (Photo 3). The retaining walls and wing walls are in good condition. Erosion of the slope is occuring at the water line where no slope protection was placed.

Downstream Slope - The downstream slope is irregular and unfinished. The owner is placing fill at the left end of the dam to provide space for parking. This fill lies at a very steep slope angle and is unprotected (Photos 2 and 4). The slope at the center and right end of the dam is not as steep (about 2 horizontal to 1 vertical) and has a brush and weed cover. The slope has not been completed at the spillway abutments. Seepage was observed in several areas along the toe of the dam. These include 3 seeps to the left of the spillway totalling 10-12 gpm, a seep measuring 1 gpm near the left wall of the spillway chute, a seep of 5+ gpm to the right of the spillway chute and a seep of 3-4 gpm (probably from hillside) near the right abutment (See Sheet B-1 for seep locations). The water emanating from all seeps was clear at the time of the inspection. A concrete fish tank is located at the toe of the dam just to the left of the spillway. This structure has no significance to the project.

Spillway - The spillway appears to be in good condition except for some cracking along the joints of the spillway chute and some deterioration of one of the fish ladder steps (See Photo 8 and Sheet B-1). A metal rail has been placed across the spillway crest, raising the crest elevation 4½ inches to elevation 15.4 (Photo 7). A concrete slab extends across the spillway allowing a clearance of 4.2 feet from spillway crest to the concrete slab.

c. Appurtenant Structures - The 8 inch corrugated metal low-level outlet appears to be in good condition. The concrete encasing the pipe was not visable. The valve and concrete valve chamber are in good condition and the valve is operable.

d. Reservoir Area - The area surrounding the lake is a steep sided, wooded and undeveloped narrow valley.

e. Downstream Channel - The downstream channel is steep sided and undeveloped to the initial impact area.

3.2 EVALUATION

Based upon the visual inspection, the project is assessed as being in fair condition. The following features which could influence the future condition and/or stability of the project were identified.

1. Seepage through the dam embankment can increase in flow, leading to instability of this structure.

2. Seepage through the joints of the concrete spillway chute could lead to instability of the spillway structure as well as erosion of the embankment slope along the spillway chute.

3. Lack of slope protection on the upstream and downstream slopes is causing erosion and sloughing of these slopes.

4. The corrugated metal pipe used for the low-level outlet does not provide sufficient strength against corrosion and the pressures it is expected to experience as a low-level outlet.

5. The outlet pipe should be gated on the upstream side of the dam so as to eliminate pressures in the pipe when the valve is in a closed position.

SECTION 4: OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES

a. General - The low-level outlet is open from September to March. This drains the lake, which allows maintenance to the beach area and minimizes plant growth in the lake. The outlet is also opened several times when the lake is full to blow out silt which collects at the inlet.

b. Description of Any Formal Warning System in Effect - No formal warning system is in effect.

4.2 MAINTENANCE PROCEDURES

a. General - The owner cuts the grass as needed on the upstream slope and crest of dam.

b. Operating Facilities - The low-level valve is open from September to March to drain the lake and is also opened several times when the lake is full to flush out silt deposits. The valve is greased once a year.

4.3 EVALUATION

The operation and maintenance procedures are satisfactory, however there are areas requiring improvement. A formal program of operation and maintenance procedures should be implemented by the owner, including documentation to provide complete records for future reference. Also, a formal warning system should be developed and implemented within the time period indicated in Section 7.1c. Remedial operation and maintenance recommendations are presented in Section 7.

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SECTION 5: EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL

The drainage area is 0.6 square miles of undeveloped, densely wooded, mountainous to rolling terrain, located in the Thames River Basin. A section of Shenipsit State Forrest is also included in the watershed.

The maximum possible storage to the top of dam (el. 21.0) is estimated to be 185 acre-feet. The Lake Mark Dam is classified as a significant hazard, small size dam. For purposes of downstream flood routing, N.G.V.D. elevations have been assumed for the computations in Appendix D. In order that this section be consistent with the rest of the text, the elevations in Appendix D have been converted to the assumed datum (spillway crest = 15.0) used in the other sections of this text.

5.2 DESIGN DATA

A design drawing prepared by Buck & Buck Engineers dated January 27, 1953 are available and provide a design high water and design low water level (See Sheet B-1). However, no hydraulic/-hydrologic design data or computations could be found.

5.3 EXPERIENCE DATA

No information on any serious problem situations arising at the dam was found, and the maximum discharge at this dam is unknown.

5.4 TEST FLOOD ANALYSIS

Based upon the Army Corps of Engineers' "Preliminary Guidance for Estimating Maximum Probable Discharges", dated March 1978, the watershed classification (mountainous to rolling), and a watershed area of 0.6 square miles, a PMF of 1680 cfs, or 2800 cfs per square mile, is estimated at the dam site. The dam is classified as a small size, significant hazard dam. Therefore, the test flood range to be considered is from the 100 year flood to the 1/2 PMF. The test flood for Lake Mark Dam is considered to be equivalent to the 1/2 PMF.

The peak inflow at the 1/2 PMF is determined to be 840 cfs, and the peak outflow is estimated to be 545 cfs (maximum pool elevation at 21.2) with the dam overtopped 0.2 feet. The spillway capacity with the pool to the top of the dam (elevation 21.0) is estimated to be 440 cfs, which is 81% of the routed test flood outflow.

5.5 DAM FAILURE ANALYSIS

The impact at downstream areas upon failure of the Lake Mark Dam was assessed using the "Rule of thumb Guidance for Estimating Downstream Dam Failure Hydrographs", issued by the Army Corps of Engineers. The peak outflow before failure of the dam would be about 440 cfs and peak failure outflow from the dam breaching is estimated to be 18,200 cfs. A breach of the dam would result in a rise of 1.0 feet in the water level of the stream 11,500± feet downstream at the initial impact area, which corresponds to an increase in the water level from a depth of 3.5 feet just before the breach to a depth of 4.5 feet just after the breach. The rapid increase in the water level at the initial impact area would inundate at least 1 house and a small business to a depth of 1± feet.

Also, just below Route 190 there are several other buildings, including one house, which would experience some minor flooding if the dam should fail (See Sheet D-1).

SECTION 6: STRUCTURAL STABILITY

6.1 VISUAL OBSERVATIONS

The dam has a cross-section with an upstream slope of 3 horizontal to 1 vertical, width at top of 20 feet and a downstream slope of 2 horizontal to 1 vertical. No evidence of toe drains was observed during the inspection. There is a concrete corewall which extends the length of the dam and to 3 feet below the top of the dam. The low-level outlet pipe is corrugated metal encased in concrete, which is not the type shown in the design plans.

The visual inspection did not reveal any indications of immediate stability problems. However, there are items with potential stability problems which require maintenance or monitoring. These consist of the type of outlet pipe used, seepage along the toe of the dam, seepage through the left wall of the spillway chute, the lack of proper grading on the downstream slope and lack of proper slope protection on the upstream and downstream slopes. For recommendations, see Section 7.

6.2 DESIGN AND CONSTRUCTION DATA

There is not enough design and construction data to permit an in depth assessment of the structural stability of the dam.

6.3 POST CONSTRUCTION CHANGES

The post construction changes of the project are the addition of a concrete platform over the spillway and a 20 foot concrete retaining wall at the upstream slope on either side of the spillway.

6.4 SEISMIC STABILITY

The dam is in Seismic Zone 1 and according to the Recommended guidelines, need not be evaluated for seismic stability.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition - Based upon the visual inspection of the site and past performance, the dam appears to be in fair condition. There are several areas requiring maintenance and monitoring. These include seepage at the toe of the dam, cracking of the concrete joints in the spillway chute, dumping of fill along the downstream slope, and the lack of proper slope protection.

Based upon the Army Corps of Engineers' "Preliminary Guidance for Estimating Maximum Probable Discharges" dated March 1978, and hydraulic/hydrologic computations, peak inflow to the lake is 840 cfs and peak outflow is 545 cfs with the test flood to elevation 21.2 (0.2 feet over the top of the dam). The spillway capacity with the water level to the top of the dam is 440 cfs, which is equivalent to 81% of the routed test flood outflow.

b. Adequacy of Information - The information available is such that an assessment of the condition and stability of the dam must be based solely on visual inspection, past performance of the dam, and sound engineering judgement.

c. Urgency - It is recommended that the measures presented in Section 7.2 and 7.3 be implemented within 1 year of the owner's receipt of this report.

7.2 RECOMMENDATIONS

It is recommended that further investigation be made by a registered professional engineer qualified in dam design and inspection pertaining to the following items. Recommendations should be made by the engineer and implemented by the owner.

1. A more detailed hydraulic/hydrologic analysis to determine the adequacy of the existing project discharge and outlet facilities. This should include all water control facilities referenced to the same datum.

2. Inspection of the low-level intake, spillway, spillway chute, discharge channel and upstream slope (when the lake is drained during winter months) to determine the condition of the embankment upstream and possible deterioration of the concrete and scouring of the channel floor.

3. Origin and significance of seepage at the toe of the embankment and the right abutment.

4. Development of a program to reduce or stop seepage through the embankment if required.

5. Installation of a new low-level outlet, abandon the 8" CMP outlet, and gating the low-level outlet at the upstream side of the dam to eliminate pressures in the pipe within the embankment.

6. Repair the concrete deterioration at the steps in the fish ladder.

7. Development of a program to monitor seepage if eliminating the seepage is not found to be necessary.

7.3 REMEDIAL MEASURES

a. Operation and Maintenance Procedures - The following measures should be undertaken by the owner within the time period indicated in Section 7.1c, and continued on a regular basis.

1. Round-the-clock surveillance during periods of heavy precipitation and high project discharge. The owner should develop and implement an emergency action plan as well as a downstream warning system in case of emergencies at the dam.

2. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference.

3. A comprehensive program of inspection by a registered professional engineer qualified in dam design and inspection should be instituted on an annual basis.

4. Placement of riprap on the usptream slope to prevent against erosion at the water line.

5. Grading of the downstream slope so as to reduce the inclination of the fill and to bring the slope at the spillway abutments to design grade. Proper slope protection should be placed and maintained.

6. Sealing the joints in the concrete spillway and spillway chute.

7. Rerouting of surface runoff from the left side of the dam so that it does not run across the top and down along the toe of the embankment.

8. Placement of riprap at the toe of the spillway chute to eliminate scouring and placement of proper protection for the end of the outlet pipe.

9. The cutting of brush and small trees on the downstream slope and clearing of debris from the spillway chute should be continued on a regular basis.

7.4 ALTERNATIVES

This study has identified no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Lake Mark Dam **DATE:** March 31, 1980

TIME: 2:30 4:00 PM

WEATHER: Sunny 60°F

W.S. ELEV. 15.4 **U.S.** _____ **DN.S**

PARTY:	INITIALS:	DISCIPLINE:
1. Peter M. Heynen	PMH	Cahn, Geotech.
2. Miron Petrovsky	MP	Cahn, Geotech.
3. Murale Atluru	MA	DTC, H&H
4. Jay A. Costello	JAC	Cahn, Geotech.
5. Tim Kavanaugh	TK	Cahn, Survey
6. Michael Melitoris	MM	Owner

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Earth Embankment	PMH, MP, JAC, TK, MM	
2.	Valve Chamber	PMH, MP, JAC, MM	
3.	Spillway	PMH, MP, JAC, MM, MA	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT Lake Mark Dam DATE 3/31/80

PROJECT FEATURE Earth Embankment BY PMH, MP, JAC, TK, MM

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	21.0 (datum: spillway crest = 15.0)
Current Pool Elevation	15.9
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed
Pavement Condition	N/A
Movement or Settlement of Crest	None observed
Lateral Movement	
Vertical Alignment	Appears good
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None observed
Trespassing on Slopes	None
Sloughing or Erosion of Slopes or Abutments	Unfinished and irregular earthfill on d/s slope
Rock Slope Protection-Riprap Failures	No riprap, u/s concrete retaining wall appears good
Unusual Movement or Cracking at or Near Toes	None observed
Unusual Embankment or Downstream Seepage	Seepage along toe
Piping or Boils	None observed
Foundation Drainage Features	
Toe Drains	
Instrumentation System	

PERIODIC INSPECTION CHECK LIST

PROJECT Lake Mark Dam DATE 3/31/80

PROJECT FEATURE Valve Chamber BY PMH, JAC, MP, TK, MM

AREA EVALUATED		CONDITION
OUTLET WORKS-CONTROL TOWER		
a) Concrete and Structural		
General Condition		Good
Condition of Joints		Appears good
Spalling		None observed
Visible Reinforcing		None
Rusting or Staining of Concrete		None
Any Seepage or Efflorescence		scum on bottom of chamber
Joint Alignment		Good
Unusual Seepage or Leaks in Gate Chamber		None observed
Cracks		
Rusting or Corrosion of Steel		
b) Mechanical and Electrical		
Air Vents		
Float Wells		
Crane Hoist		N/A
Elevator		
Hydraulic System		
Service Gates		8" hand operated gate valve, operable
Emergency Gates		
Lightning Protection System		N/A
Emergency Power System		
Wiring and Lighting System		

PERIODIC INSPECTION CHECK LIST

PROJECT Lake Mark Dam DATE 3/31/80

PROJECT FEATURE Concrete Spillway & chute BY PMH, MP, JAC, NA, MM

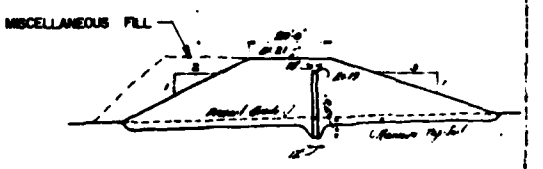
AREA EVALUATED	CONDITION
OUTLET WORKS-SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a) Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Good
b) Weir and Training Walls	
General Condition of Concrete	Appears good
Rust or Staining	None observed
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	Seepage through joints of left wall spillway chute
Drain Holes	
c) Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Some
Floor of Channel	Natural streambed
Other Obstructions	Dead trees across channel

APPENDIX B

ENGINEERING DATA AND CORRESPONDENCE

NOTES (AUGUST 1980)

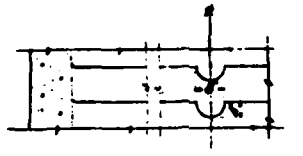
1. ADDITIONAL INFORMATION CONCERNING SEEPS, U/S RETAINING WALL, FILL AND LOW-LEVEL OUTLET ADDED AFTER DAM INSPECTION 3/31/80 BY CAHN ENGINEERS, INC. FOR THE ARMY CORPS OF ENGINEERS, NEW ENGLAND DIVISION.
2. ELEVATIONS ARE NOT N.G.V.D.
   SPILLWAY CREST = ELEVATION 15.0
3. ORIGINAL PLAN REDUCED 50%. USE BAR SCALE BELOW ORIGINAL SCALE.
4. AN N.G.V.D. DATUM WAS ASSUMED FOR PURPOSES OF SPILLWAY ANALYSIS.
   SPILLWAY CREST ≈ ELEVATION 755.0



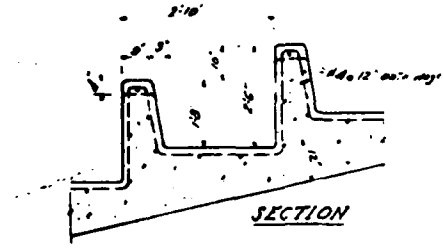
TYPICAL SECTION THROUGH DIKE

Scale 1:50

20 0 20



ELEVATION



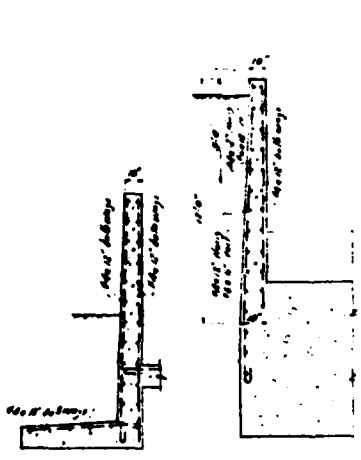
SECTION

SPILLWAY DETAILS

Scale 2:1=0

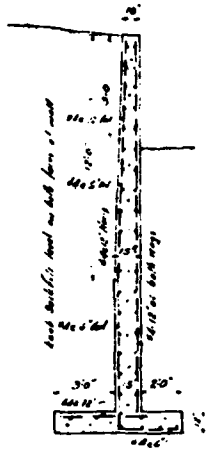
2 0 2

APPROXIMATE MISCELLANEOUS



SECTION C-C

SECTION B-B



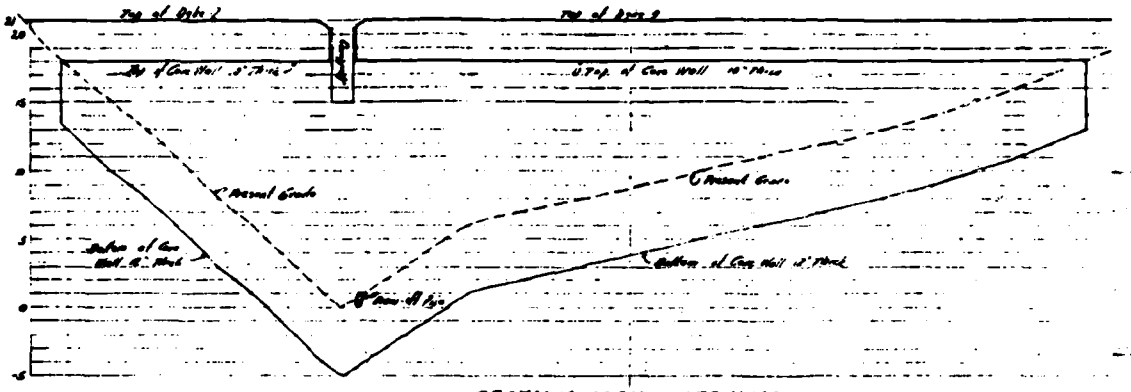
SECTION A-A

SPILLWAY WALL DETAILS

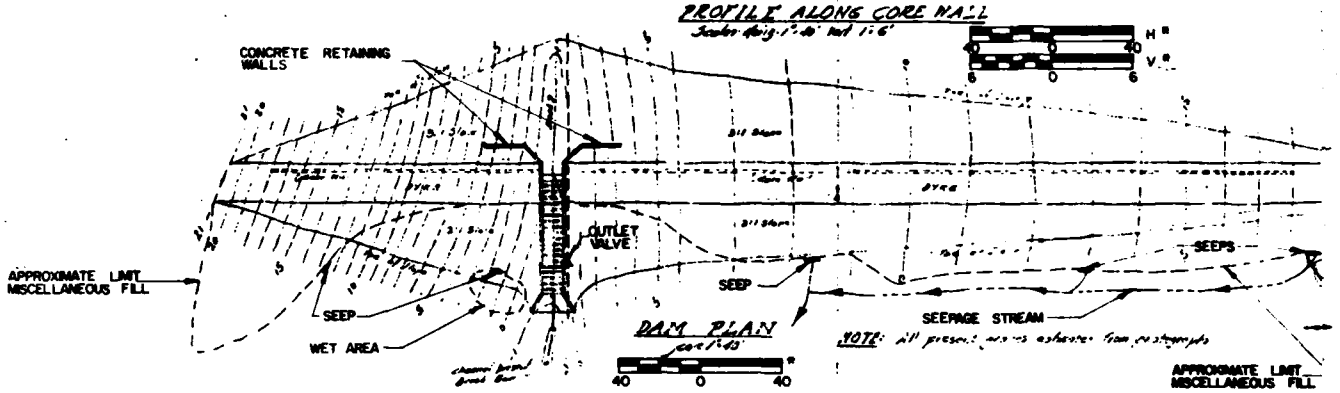
Scale 3:1=0

4 0 4

1 of 3

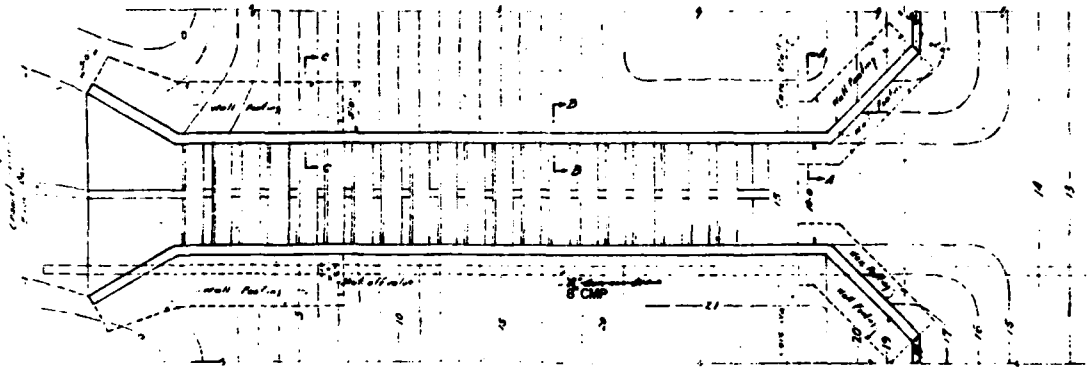


PROFILE ALONG CORE WALL

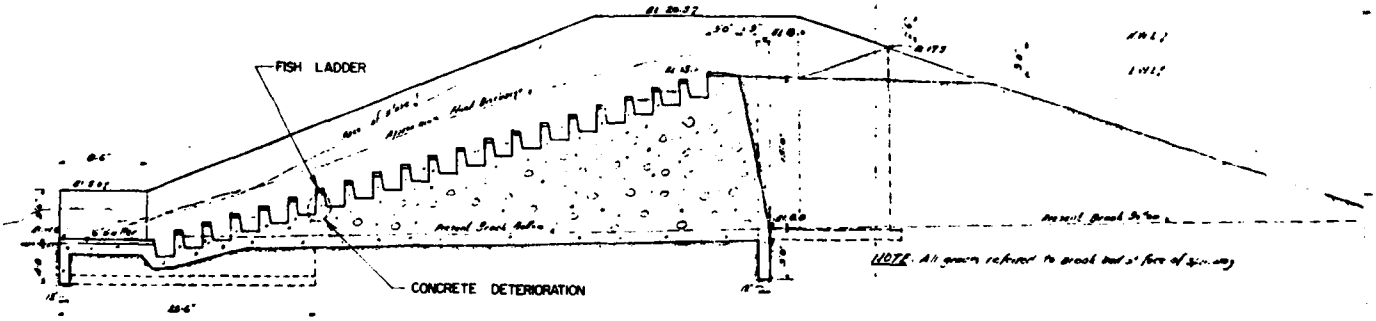


DAM PLAN

NOTE: All pressure mains asbestos from pumphouse



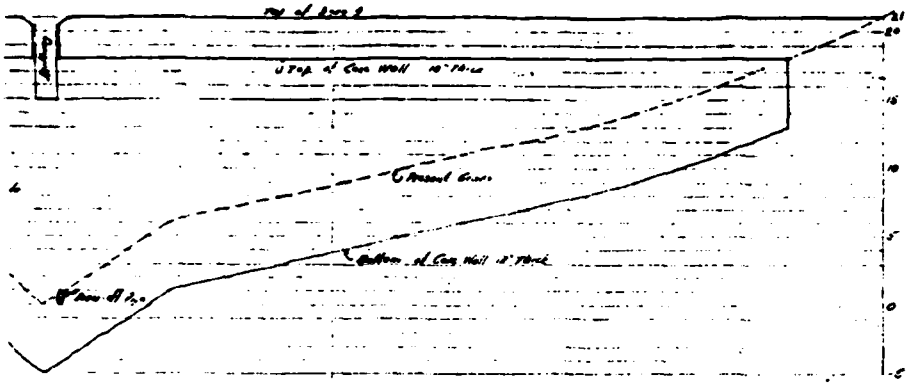
SPILLWAY PLAN



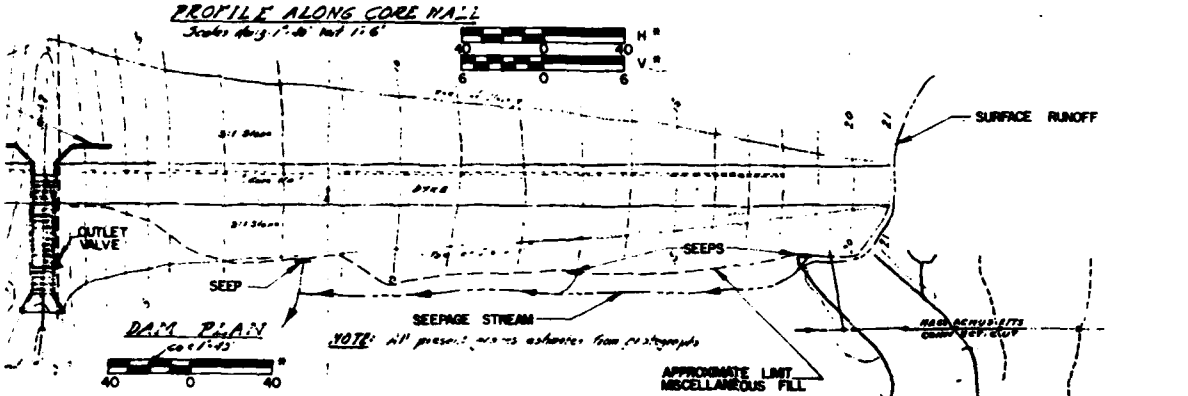
NOTE: All grass removed to crest and at face of spillway

SPILLWAY SECTION

2 of 3

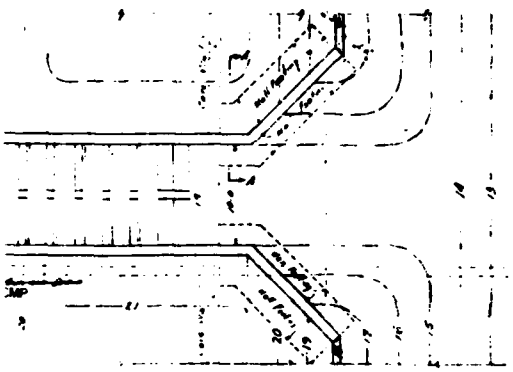


PROFILE ALONG CORE WALL

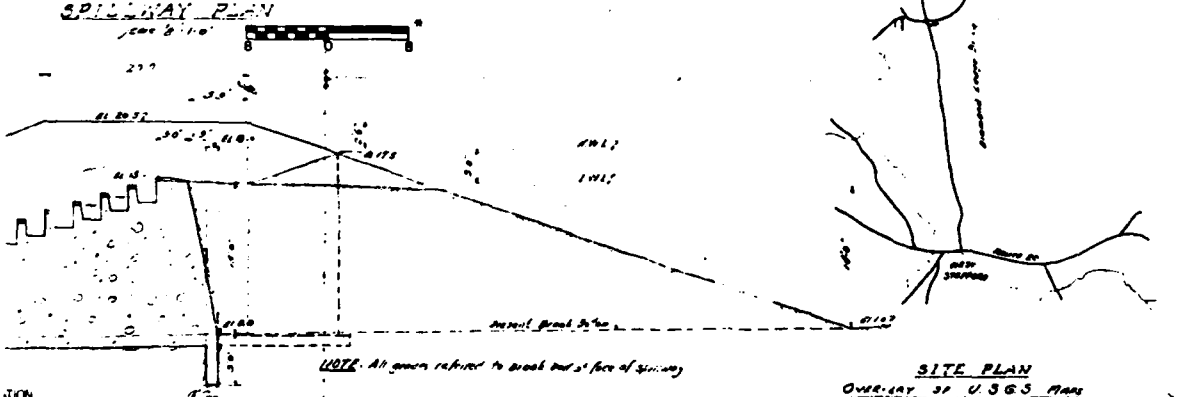


DAM PLAN

NOTE: All grades refered to crest of spillway



SPILLWAY PLAN



NOTE: All grades refered to crest of spillway

SITE PLAN

Overlay of USGS Map

SPILLWAY SECTION

PLANS & DETAILS
PROPOSED DAM
MICHAEL MOLITORIS
WEST STAFFORD, CONNECTICUT

SHEET B-1

383

LAKE MARK DAM

EXISTING PLANS

"Plans and Details, Proposed Dam
for Michael Molitoris, West Stafford, Conn."
Buck and Buck, Engineers
Hartford, Conn.
Jan. 27, 1953
1 Sheet

SUMMARY OF DATA AND CORRESPONDENCE

DATE	TO	FROM	SUBJECT	PAGE
July 29, 1952	Benjamin H. Palmer, State Board Supervision of Dams	William S. Wise, Chairman State Board Supervision of Dams	Application for Construction permit	B-3
Aug. 11, 1952	Mr. Michael Molitoris	R.P. Hunter, Superintendent State Board of Fisheries and Game	Approval for Construction	B-5
Feb. 9, 1953	Mr. Michael Molitoris	Buck and Buck, Engineers	Preliminary permit for construction	B-5
Aug. 13, 1954	Mr. Henry W. Buck, Buck and Buck, Engrs.	B.H. Palmer State Board Supervision of Dams	Inspection of dam construction	B-8
Dec. 20, 1956	Mr. William S. Wise, State Board Supervision of Dams	B.H. Palmer, State Board Supervision of Dams	Inspection of dam	B-9
June 24, 1963	Water Resources Commission	Chandler and Palmer, Civel Engineers	Inspection of dam	B-10
Jan. 24, 1972	Conn. Dept. of Environmental Protection	Macchi and Hoffman, Engrs.	Inspection and recommendation for certificate of approval	B-11
April 27, 1972	Mr. Michael Molitoris	Conn. Dept. Environmental Protection, Water Resources	Certificate of Approval	B-12
No Date	Files	Conn. Dept. Environmental Protection, Water Resources	Inventory Data	B-13

July 29, 1952

Mr. Benjamin H. Palmer
Thayer Building
Norwich, Connecticut

Dear Mr. Palmer:

Enclosed is an application for the construction of a dam in Stafford Springs. This application has been submitted by Henry Buck who has been asked to design the structure.

In talking with Henry He is uncertain in his mind as to whether the structure should come under the jurisdiction of the Board. You will notice that under remarks he indicates that the culvert under the wood road below the dam has carried he hurricane flood and also there is a swamp for several miles below the road so that not too much damage could result from the failure of the structure. I do feel, however, that because of the size of the dam and the fact that approximately 33 acre feet of water will be stored behind it, that it might be considered coming under the Board's jurisdiction. Henry said that because of the topography much of the area is quite shallow although it has a 12' depth at the deepest point.

Regardless of whether it is considered to come under the jurisdiction of the Board Henry Buck will design the structure. If it must be submitted to the Board for approval he will have to prepare more detailed plans than he otherwise would, consequently the expense to Mr. Molitoris will be a little higher.

I am forwarding this to you for whatever disposition you wish to make of it.

Very truly yours,

William S. Wise
Director

WSW/h
enc.

File # _____
Date JULY 28, 1958

PRELIMINARY APPLICATION FOR
CONSTRUCTION, ALTERATION OR REPAIR OF DAM

Watershed WILLIMANTIC RIVER

Name of River or Brook DIAMOND LEDGE BROOK

Name of Town, Village, etc. STAFFORD SPRINGS

Directions for reaching site FROM WEST STAFFORD DRIVE NORTH ON PAVED ROAD 1.5 MILES. THENCE NORTH EAST ON GRAVEL ROAD 0.7 MILE. FOLLOW WOOD ROAD ON WEST SIDE OF BROOK, NORTH FOR 1000 FEET TO CLEARED DAM SITE.

Purpose of construction, alteration or repair NEW CONSTRUCTION

Water impounded for what purpose RECREATION

Area of Watershed 0.61 SQUARE MILES
General dimensions:
Total length of Dam 400' Length of Spillway 20'
Height of Spillway above River bed - average 11' maximum 12'
Height of Abutments above Spillway 3'

Depth of water at Spillway elevation:
Average 3' Maximum 12'

Approximate water surface area at Spillway elevation 11 acres

Kind of Dam (earth, masonry, rock, timber, etc.) EARTH - CONCRETE SPILLWAY

Character of River bed (rock, gravel, silt) GRAVEL

Remarks: 100 YR. FLOOD AT C_p 0.75 = 175 CFS. 36" CULVERT UNDER ROAD BELOW SITE PASSED HURRICANE FLOOD - CAPACITY 40 CFS. SWAMP BELOW ROAD AND NO DEVELOPMENT ON BROOK FOR 2 MILES.

Name of owner of ~~record~~ MICHAEL MOLITORIS
Address R.F.D. 1 STAFFORD SPRINGS
Telephone No. 657 W 2

NOTE: Rough plans are useful. Use plain sheets for additional information.

Referred to _____ Date _____
Inspected by _____ Date _____
Comments: _____

(Fill out in triplicate)

STATE BOARD OF FISHERIES AND GAME

ADDRESS ALL MAIL TO
STATE BOARD OF
FISHERIES AND GAME
STATE OFFICE BUILDING, HARTFORD

STATE OF CONNECTICUT

August 11, 1952

Mr. Michael Molitoris
RFD#1
Stafford Springs, Conn.

Dear Sir:

Under Section 5001 of the General Statutes authorization is hereby granted for the construction of a dam on Diamond Ledge Brook on your property located in Stafford Springs, it being my understanding that the public interest in the stream will not be affected by such a dam.

This permit is issued with the understanding that a fishway will be provided.

It will be necessary to have the project approved by the State Board of Supervision of Dams, whose address is Room 317, State Office Building, Hartford, Connecticut.

Very truly yours,

R. P. Hunter
Superintendent

rs

cc: State Board of Supervision of Dams
State Warden Wraight

BUCK & BUCK
ENGINEERS
650 MAIN STREET HARTFORD 3, CONNECTICUT

HENRY WOLCOTT BUCK
ROBINSON D. BUCK

COMM. 6463-1

FEBRUARY 9, 1953

MR. MICHAEL MOLITORIS
R. D. 1
STAFFORD SPRINGS, CONNECTICUT

DEAR MR. MOLITORIS:

WE ENCLOSE HEREWITH THE PRELIMINARY PERMIT FROM THE STATE BOARD OF SUPERVISION OF DAMS COVERING YOUR PROPOSED CONSTRUCTION, TOGETHER WITH MR. PALMER'S LETTER OF TRANSMITTAL. YOU SHOULD HOLD THESE IN SAFE KEEPING UNTIL THE DAM IS COMPLETED AND THE FINAL PERMIT ISSUED.

WE HAVE AS YET RECEIVED NO WORD FROM THE STATE FISH AND GAME COMMISSION AND WILL ADVISE YOU AS SOON AS WORD IS RECEIVED FROM THEM.

SINCERELY YOURS,

BUCK & BUCK

HENRY WOLCOTT BUCK

ENCLS:

BOARD OF SUPERVISION OF DAMS 3- 63

PRELIMINARY PERMIT

Norwich, Conn.

Feb 6, 1963

To Owner Michael Molitoris

P. O. Address West Stafford, Conn

I have inspected the site and have examined the plans marked "Proposed Dam For Michael Molitoris" By Buck & Buck Engrs

and the specifications therefore, submitted by you to the Board of Supervision of dams for Construction of Dam and Fishway

on Diamond Ledge Brook in the Town of Stafford Conn

The same are approved, and such proposed construction work is hereby authorized.

Benjamin H Palmer

Member, Board of Supervision of Dams

"copy"

#114 Thayer Building
Norwich, Connecticut

August 13, 1954

Mr. Henry W. Buck
Buck & Buck
Engineers
650 Main Street
Hartford (3) Connecticut

Dear Henry,

This morning I made an appointment with Mr. Molitoris and visited his dam at West Stafford. He had the spillway section dug out and dewatered. The soil appeared to be a good quality clay with some small stones mixed in. This is at the deeper point of the excavation under the cut-off wall. I would think that this soil would be very tight and is suitable for the foundation of the dam.

Mr. Molitoris is doing much of the work himself and, therefore, progress is rather slow. However, what was done appeared to be in good condition and his forms and reinforcing rods are all in place and he plans to pour the spillway section within a short time.

I am satisfied that the foundation conditions are good and that the work is being done in a satisfactory manner.

Very truly yours,
Benjamin H. Palmer, Jr.
Member, State Board of Supervision of Dams

BHP/ew
c.c.: Chairman Wm. S. Wise

STATE OF CONNECTICUT

STATE BOARD FOR THE SUPERVISION OF DAMS

State Office Building · Hartford (15) Connecticut

December 20, 1956

Mr. William S. Wise
Chairman, State Board for Supervision of Dams
State Office Building
Hartford (15) Connecticut

Dear Mr. Wise:-

On February 6, 1953 I issued a Preliminary Permit for construction of a dam on Diamond Ledge Brook in Stafford for Mr. Michael Molitoris. I am enclosing copy of the preliminary permit. I visited this site the other day and found that it has never been completed and in fact no work has apparently been done there for at least two years. I am enclosing a blueprint prepared by Buck & Buck showing the structure to be completed and thought that you should have this in your files.

Very truly yours,

B. H Palmer

Member, State Board for the Supervision of Dams

BHP/ew
Enc.

BENJAMIN H. PALMER
WILFARD B. PALMER

CHANDLER & PALMER
CIVIL ENGINEERS
114-116 THAYER BUILDING
TELEPHONE TURNER 7-8640

MEMBERS AMERICAN AND CONNECTICUT SOCIETIES OF CIVIL ENGINEERS

DAMS
WATER SUPPLIES
SEWERAGE
APPRAISALS
REPORTS
SURVEYS

NORWICH, CONN.

June 24, 1963

Stateof Connecticut
Water Resources Commission
State Office Building
Hartford 15, Connecticut

RE: Molitoris Dam
Stafford, Connecticut

Gentlemen:

I visited the Molitoris Dam last Saturday and talked with Mr. Molitoris at the site.

This dam was constructed about seven years ago and has never been entirely completed. The down-stream slope is rather ragged and unfinished. There is a leak in one joint of the pipe coming through the dam which permits some leakage to show down-stream.

This pond is used for bathing and fishing in summertime and the owner makes a practice of drawing the pond down about 6 feet in September. He stated that this Fall he would repair the leak and attempt to complete the down-stream slope. I do not feel there is any hazard with the condition as it now exists. I do not feel like issuing a final certificate because the work is not completed. I urged the owner to finish it this Fall so that we could issue a final certificate at this time.

Very truly yours,

CHANDLER & PALMER

BHP/nir

MACCHI & HOFFMAN • ENGINEERS

EXECUTIVE OFFICES • 44 GILLETT STREET • HARTFORD, CONN., 06105 • PHONE (203) 525-6631

A. J. MACCHI, P.E.
H. R. HOFFMAN, P.E.
MICHAEL GIRARD

ASSOCIATE CONSULTANT
PROF. C. W. DUNHAM

January 24, 1972

State of Connecticut
Department of Environmental Protection
165 Capitol Avenue
Hartford, Connecticut

Attention: Mr. William H. O'Brien, III

Re: Lake Mark Dam
Approx. 2 Miles West of
Ellitrope Dam
Code W24.0 MR2.4 ED1.3 DL2.1

Gentlemen:

An inspection of the above-referenced dam was made by William H. O'Brien, Victor Galgowski and A. J. Macchi on Friday, January 21, 1972. The owner, Mr. Michael Molitons, who resides on the site was present.

This dam was constructed about 1956 from plans prepared by Buck & Buck Engineers in Hartford. It was inspected by Mr. Palmer of Chandler & Palmer Engineers in 1963.

The dam is completed and appears to be in a safe condition. It is therefore recommended that a Certificate of Approval be sent to the owner, since this has never been done.

Very truly yours,

MACCHI & HOFFMAN, ENGINEERS

A. J. MACCHI

vmc

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

WATER RESOURCES

CERTIFICATE OF APPROVAL

April 27, 1972

Lake Mark Dam
c/o Mr. Michael Molitoris
Diamond Ledge Road
Stafford, Connecticut

TOWN: Stafford
RIVER: Diamond Ledge Brook
TRIBUTARY: Edison Brook
CODE NO.: M2.40M2.4ED1.3DL2.2

Dear Mr. Molitoris:

NAME AND LOCATION OF STRUCTURE:

Lake Mark Dam
Diamond Ledge Road
Stafford, Conn.
c/o Mr. Michael Molitoris

DESCRIPTION OF STRUCTURE AND WORK PERFORMED: This is a 580 ~~400~~ feet long earthen dam with a top width of 20 feet and an elevation of 14 feet above streambed. The embankments have a 3:1 slope upstream and 2:1 downstream. A 14 feet high concrete core is located in the center of the dam. A fish ladder is provided in the 20 feet wide concrete spillway. This structure creates a 11 acre pool with a 3 feet depth at the spillway and a maximum depth of 12 feet.

CONSTRUCTION PERMIT ISSUED UNDER DATE OF:

February 6, 1953

This certifies that the work and construction included in the plans submitted, for the structure described above, has been completed to the satisfaction of this Department and that this structure is hereby approved in accordance with Section 134 of Public Act No. 872.

The owner is required by law to record this Certificate in the land records of the town or towns in which the structure is located.

Dan W. Lufkin
Commissioner

DWL:WHO:jg

under 25 limit
no spillway code

12 0

STATE BOARD FOR THE SUPERVISION OF DAMS
INVENTORY DATA

APP CT-337

B - PALMER REPORT 6-24-63

Name of Dam or Pond 94 A Lake Mark

Code No. W24.0 HR 2.4 ED 1.3 DL 2.2

Location of Structure Long 72-21.0

Town Stafford

Name of Stream Diamond Ledge Brook Lat 42-00.1

U.S.G.S. Quad. Monson Mass

Owner Michael Moliteris

Address Diamond Ledge Road
Stafford Ct

Pond Used For Swimming DA 0.615 sq mi

Dimensions of Pond: Width _____ Length _____ Area 11A

Total Length of Dam 500' Length of Spillway 10FT

Depth of Water Below Spillway Level (Downstream) 18 FT

Height of Abutments Above Spillway 5'

Type of Spillway Construction _____

Type of Dike Construction Sand ... Steep

Downstream Conditions Woods, central West Stafford Steeper than spillway abutment.

1956 Summary of File Data inspection in 56 - not built them

Remarks
spring at toe 20' east of spillway
" at face at east spillway abutmnt
" at toe 10' West of spillway
spillway abutments not finished downstream

D/S HAB 2.

APPENDIX C

DETAIL PHOTOGRAPHS

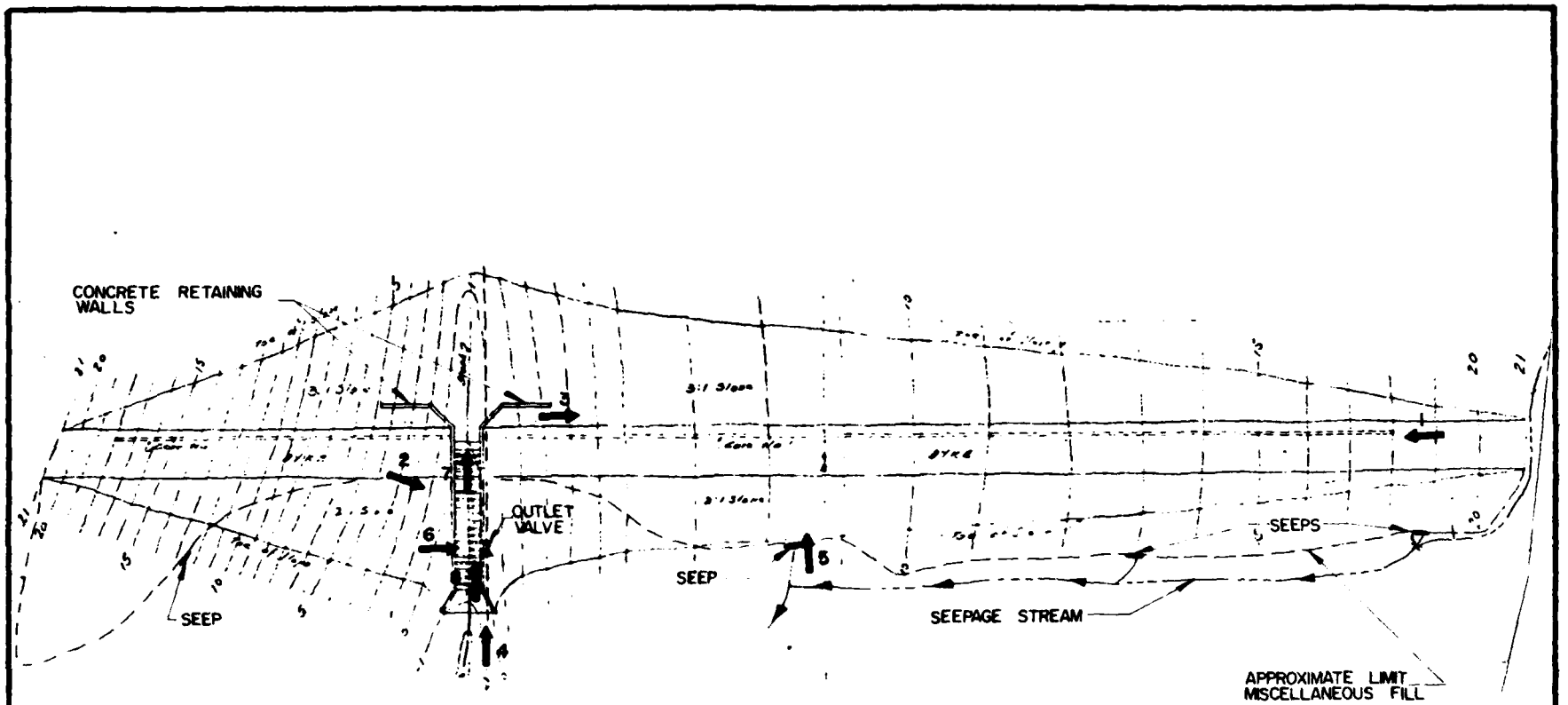


PHOTO LOCATION PLAN

LAKE MARK DAM

SHEET C-1

Photo 1 - Upstream slope and top of dam taken from left abutment. Parking lot at left and beach in foreground (March 1980).

Photo 2 - Downstream slope from right end of dam. Spillway in foreground and fill being dumped in background (March 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS	NATIONAL PROGRAM OF	Lake Mark Dam Diamond Ledge Brook Stafford, Ct.
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE# 27785 KD DATE Aug. 1980 PAGE C-1

Photo 3 - Upstream slope from spillway. Erosion and irregularity of slope in background, concrete retaining wall in foreground (March 1980).

Photo 4 - Spillway from downstream. Top of outlet pipe is visable at center of discharge channel. Area requiring fill at right and left side of spillway chute (March 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Lake Mark Dam Diamond Ledge Brook Stafford, C t.
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE # 27785 KD DATE Aug. 1980 PAGE C-2

Photo 5 - Seepage emanating from central portion of the toe of the embankment (March 1980).

Photo 6 - Crack in left wall of spillway chute where water is seeping through and down the embankment slope (March 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS. CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Lake Mark Dam Diamond Ledge Brook Stafford, Ct. CE #27785 KD DATE Aug., 1980 PAGE C-3

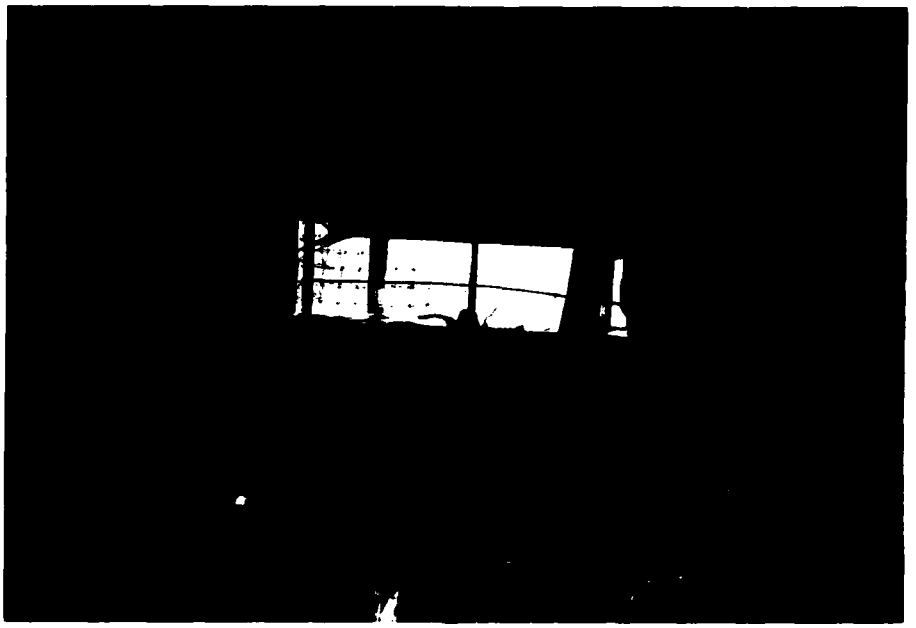


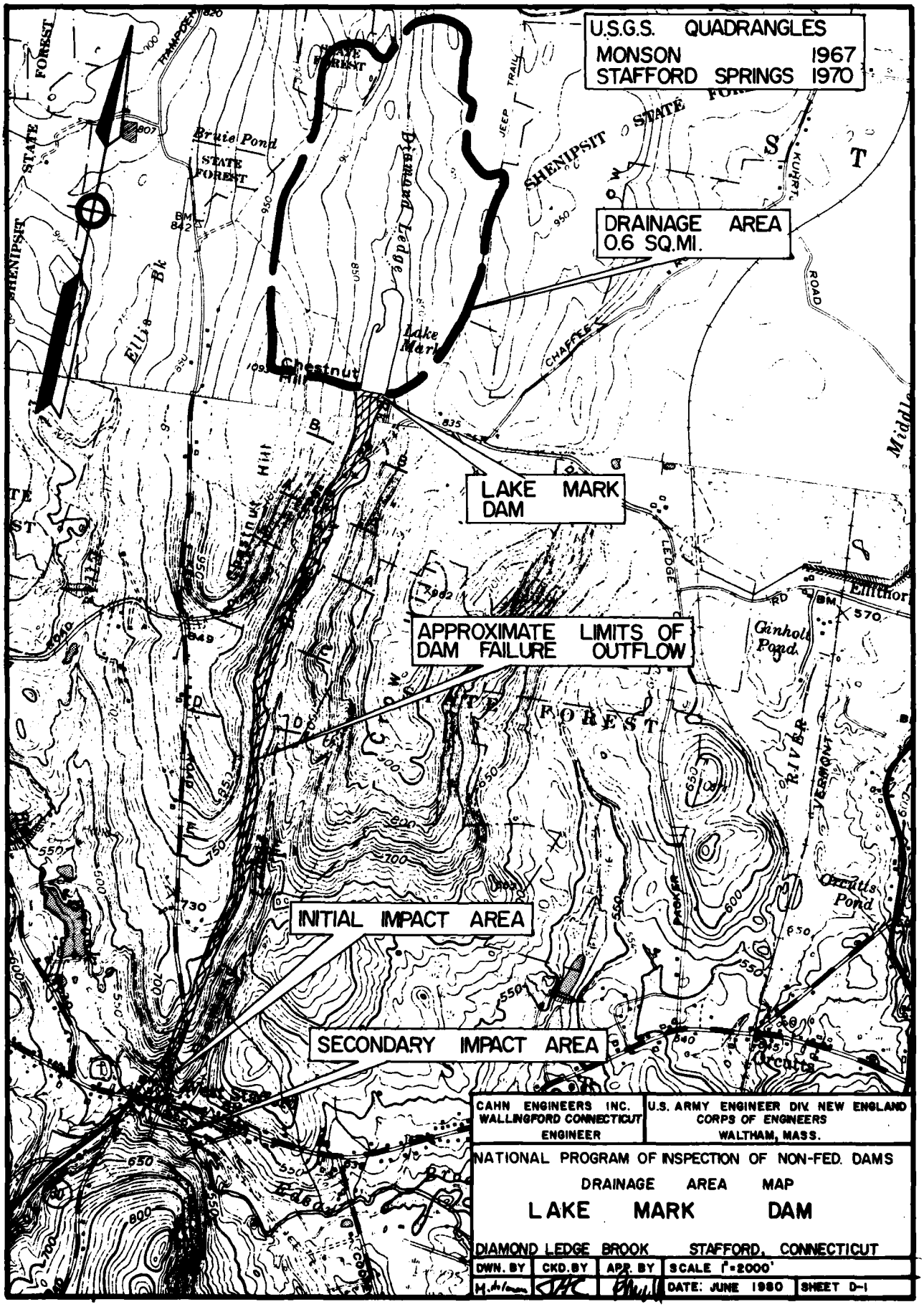
Photo 7 - Crest of spillway from downstream. Note 4" metal rail on top of crest (July 1980).

Photo 8 - Deterioration of concrete at left side of spillway chute (July 1980).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Lake Mark Dam Diamond Ledge Brook Stafford, Ct.
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE#27785 KD DATE Aug. 1980 PAGE C-4

APPENDIX D

HYDRAULICS/HYDROLOGIC COMPUTATIONS


U.S.G.S. QUADRANGLES
MONSON 1967
STAFFORD SPRINGS 1970
DRAINAGE AREA
0.6 SQ.MI.
LAKE MARK
DAM
APPROXIMATE LIMITS OF
DAM FAILURE OUTFLOW
INITIAL IMPACT AREA
SECONDARY IMPACT AREA
Bruie Pond
STATE FOREST
Diamond Ledge
Lake Mark
Chestnut Hill
Ginhold Pond
Orcutts Pond
SHENIPSIT STATE FOREST
JEEP TRAIL
CHAFFEE ROAD
LEDGE RD
BM 842
BM 570
CAHN ENGINEERS INC.
WALLINGFORD CONNECTICUT
ENGINEER
U.S. ARMY ENGINEER DIV NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
DRAINAGE AREA MAP
LAKE MARK DAM
DIAMOND LEDGE BROOK STAFFORD, CONNECTICUT
DWN. BY
CKD. BY
APP. BY
SCALE 1"=2000'
DATE: JUNE 1980
SHEET D-1

PROBABLE MAXIMUM FLOOD (PMF) DETERMINATION

DRAINAGE AREA —
THE TOTAL DRAINAGE AREA = 0.6 SQ. MILES.
OBTAINED FROM PLANIMETERING THE DRAINAGE AREA FROM USGS MAP.

WATERSHED CLASSIFICATION — "MOUNTAINOUS" TO "ROLLING"
THIS CLASSIFICATION IS ASSIGNED BY EXAMINING THE USGS MAP AND A VISUAL INSPECTION OF SOME OF THE TERRAIN

PMF PEAK INFLOW —
FROM THE CORPS OF ENGINEERS DECEMBER 1977 PEAK FLOW RATES GUIDE CURVES FOR A DRAINAGE AREA OF 0.6 SQ. MILES, PMF WAS OBTAINED BY EXTRAPOLATION. ACCOUNTING FOR A PORTION OF THE TERRAIN WHICH CAN BE CONSIDERED "ROLLING," A PMF INTENSITY LESS SEVERE THAN MOUNTAINOUS WAS SELECTED WITH A VALUE OF 2800 CFS/SQ. MILES.

∴ PMF PEAK INFLOW = 2800 × 0.6 = 1680 CFS.

SIZE CLASSIFICATION —
FOR THE PURPOSE OF DETERMINING PROJECT SIZE, THE MAXIMUM STORAGE ELEVATION IS CONSIDERED EQUAL TO THE TOP OF DAM.

HEIGHT OF DAM = 22 FEET
(FROM EXISTING DESIGN PLANS)

PLANIMETERING FROM USGS MAP FOR LAKE SURFACE AREAS
AT EL. 755*, ASSUMED FOR SPILLWAY CREST, AREA = 16 ACRES
AT EL. 760 AREA = 19 ACRES
AT EL. 770 AREA = 22 ACRES

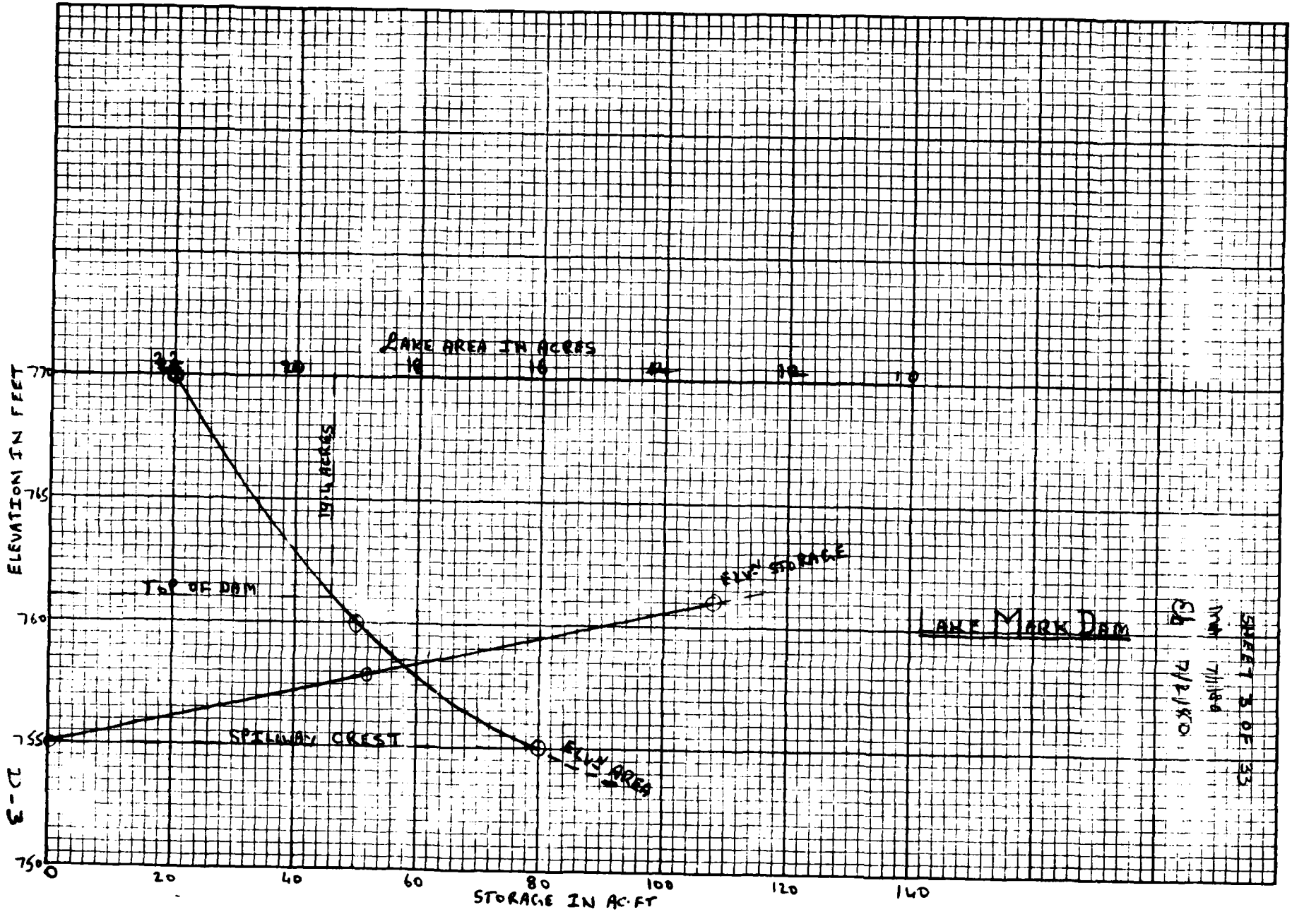
A STAGE-LAKE AREA CURVE IS PLOTTED (SHEET 3)
LAKE AREA TO TOP OF DAM FROM THIS CURVE, EL. 761 = 19.4 Ac.
LAKE AREA TO SPILLWAY CREST EL. 755 = 16 Ac.
AVERAGE LAKE AREA BETWEEN SPILLWAY CREST AND TOP OF DAM = 18 Ac.
∴ MAXIMUM STORAGE CAPACITY BETWEEN THE SPILLWAY CREST & TOP OF DAM = 6FT × 18 Ac = 108 Ac.Ft.

ESTIMATED STORAGE VOLUME BELOW SPILLWAY CREST = $\frac{1}{3}bh$
$= \frac{1}{3} \times 16 \times 14 \cong 75$ Ac.Ft.
(h = DIFFERENCE OF ELEVATIONS 755 − 741 = 14'; b = 16 ACRES)

ESTIMATED STORAGE VOLUME TO TOP OF DAM
= STORAGE VOLUME TO SPILLWAY CREST + STORAGE VOLUME BETWEEN SPILLWAY CREST AND TOP OF DAM.
= 75 + 108 Ac.Ft = 183 Ac.Ft

*THE USGS MAP DOES NOT INDICATE THE POOL ELEV. AT THE DAM. FOR THE PURPOSE OF THIS ANALYSIS, THE SPILLWAY CREST ELEV. IS ASSUMED AS NORMAL POOL ELEV. AND EXAMINING THE USGS MAP CONTOURS, AN EL. OF 755 NGVD IS ASSUMED REASONABLE FOR NORMAL POOL.

THE ORIGINAL DESIGN PLAN PREPARED BY GUCK & GUCK ASSOCIATES (JANUARY 1953) INDICATE AN ELEV. OF 16 FOR SPILLWAY CREST. THUS TOP OF THE DAM WHICH HAS AN ELEV. OF 21 PER THESE PLANS IS EQUIVALENT TO EL. 761 NGVD. THE NGVD IS CHOSEN FOR THIS ANALYSIS FOR CONVENIENCE OF ESTABLISHING A RELATIONSHIP FOR D/S HAZARD CONDITIONS.



LAKE MARK DAM

SHEET 3 OF 33

DATE 7/12/00

C-3

THUS, ACCORDING TO CORPS OF ENGINEERS GUIDELINES, TABLE 1, THE LAKE MARK DAM IS CLASSIFIED SMALL BASED UPON STORAGE (< 1000 & ≥ 50), EVEN THOUGH HEIGHT OF THE DAM IS $< 25'$. USING THE ABOVE DATA A STAGE-STORAGE CURVE IS PLOTTED (SHEET 3) FOR LATER USE.

HAZARD POTENTIAL — SIGNIFICANT HAZARD CLASSIFICATION BASED ON DAM BREACH ANALYSIS AND RELATIVE LOCATIONS OF HOUSES AND OTHER STRUCTURES. A DETAILED DISCUSSION OF HAZARD POTENTIAL IS INCLUDED AT THE END OF BREACH ANALYSIS SECTION OF APPENDIX D.

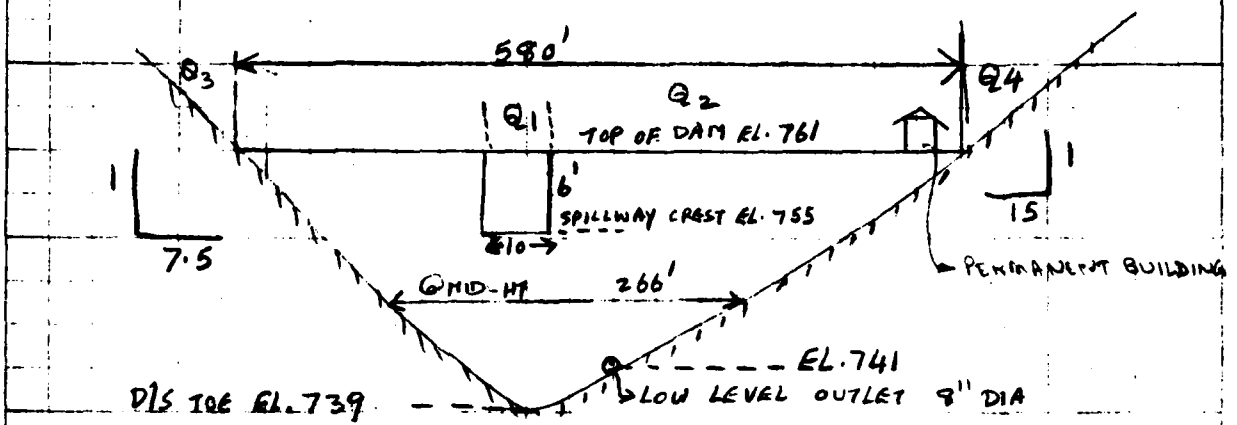
TEST FLOOD PEAK INFLOW (Q_P) —
FOR THE SMALL SIZE AND SIGNIFICANT HAZARD POTENTIAL CLASSIFICATION, TABLE 3 OF CORPS OF ENGINEERS RECOMMENDED GUIDELINES, THE TEST FLOOD COULD BE IN THE 100 YR TO $\frac{1}{2}$ PMF RANGE. SELECTING THE HIGHER VALUE OF $\frac{1}{2}$ PMF, THE TEST FLOOD PEAK INFLOW $= \frac{1}{2} \times 1680 =$ 840 CFS.

$\frac{1}{2}$ PMF WOULD RESULT FROM $9\frac{1}{2}$" RUN-OFF FROM A DRAINAGE AREA = 0.6 SM

$\therefore$ STORM VOLUME $= \frac{9\frac{1}{2}}{12} \times 0.6 \times 640 =$ 304 AC-FT.

MAXIMUM STORAGE CAPACITY OF 108 AC-FT IS 35% OF THE STORM VOLUME OF 304 AC-FT.

TEST FLOOD ANALYSIS



POTENTIAL FLOOD OVERFLOW PROFILE

THE SPILLWAY HAS A BROAD CRESTED WEIR 10' LONG & 3' WIDE. THE OUTFLOW CAPACITIES ARE CALCULATED AND SHOWN ON SHEET 7 .. THE SPILLWAY IS 10' LONG AND HAS A CONCRETE BROAD CRESTED WEIR

$Q_1 = CL H^{3/2}$, $L=10'$, & $C=3.0$ ASSUMED TO INCLUDE THE EFFECT OF THE
$= 3.0 \times 10 \times H^{3/2} = 30 H^{3/2}$ CONCRETE SLAB OVER THE SPILLWAY

FOR THE DAM $- Q_2 = CLH^{3/2}$, WHERE $C=2.7$ ASSUMED,
$= 2.7 \times 550 \times H^{3/2}$ $L = 580' - 10' - 20' = 550'$
$= 1485 H^{3/2}$

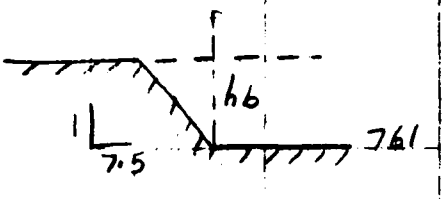
(ASSUMING THE WIDTH OF THE BUILDING TO BE 20' AND DEDUCTING FROM TOTAL LENGTH)

THE OVERFLOW CAPACITY OF THE RIGHT ABUTMENT IS CALCULATED BY THE USGS METHOD *

$Q_3 = 0.4\ C L\ hb^{3/2}$ $C = 2.5$ (IRREGULAR BRUSH)

$= 0.4 \times 2.5 \times 7.5\ hb \times hb^{3/2}$

$= 7.5\ hb^{5/2}$



SIMILARLY THE OVERFLOW CAPACITY Q_4 OF THE LEFT ABUTMENT IS CALCULATED BY THE USGS METHOD

LOW LEVEL OUTLET — THE DIAMETER OF THE CONDUIT IS NOTED TO BE 8" AND THE DISCHARGE Q_5 FOR POOL AT TOP OF DAM IS ESTIMATED TO BE 10 CFS ACCOUNTING FOR USUAL LOSSES.

* USGS RECOMMENDED FORMULA FOR MORE PRECISE DISCHARGE OVER INCLINED DAM/EMBANKMENT CREST (REF: MEASUREMENT OF PEAK DISCHARGES AT DAMS BY INDIRECT METHODS. USGS BOOK 3, CHAPTER A5, PAGE 3-4, 1968)

TABULATION OF DISCHARGE RATES (CFS)

	ELV. N.	SPILLWAY Q_1 CR EL 755	DAM Q_2 CR EL. 761	RT. ABUT. Q_3 EL. 761	LEFT. ABUT. Q_4 EL. 761	TOTAL DISCHARGE
	758	156	0	0	0	156
	759	240	0	0	0	240
	760	335	0	0	0	335
TOP OF DAM	761	440	0	0	0	440
TEST FLOOD	761.15	460	85	0	0	545
	761.5	497	525	1	3	1026
	762	556	1485	8	15	2064

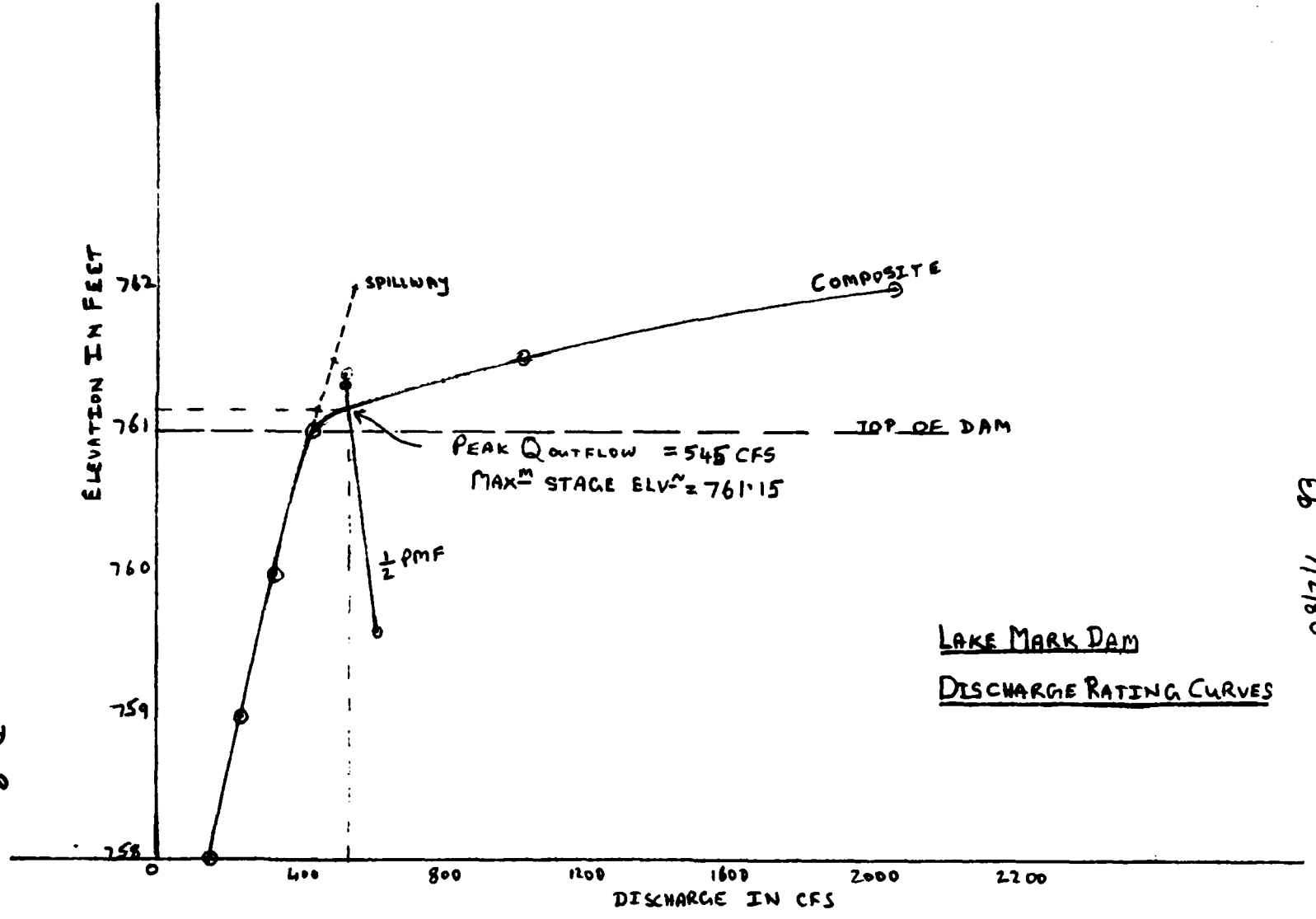
NOTE: CONSIDERING THE OVERFLOW CAPACITIES ABOVE, THE DISCHARGE CAPACITY OF THE LOW LEVEL OUTLET IS NEGLECTED.

WITH ABOVE DATA, DISCHARGE RATING CURVES ARE PLOTTED (SHEET 8)

DETERMINATION OF PEAK OUTFLOW

SHORTCUT ROUTING OF RESERVOIR—
FOR TEST FLOOD INFLOW OF =840 CFS Q_{P_1}

$\frac{1}{2}$PMF HAS $9\frac{1}{2}$" OF RUN-OFF FROM THE DRAINAGE AREA.



LAKE MARK DAM

DISCHARGE RATING CURVES

EB 7/2/80

MWA 7/11/80

SHEET 8 OF 33

D-8

NOW, FROM THE RATING CURVE (SHEET 8) FOR 840 CFS. WE OBTAIN AN EL. 761.38
AND FROM THE STORAGE CURVE FOR EL. 761.38, WE OBTAIN A STORAGE OF 114 AC. FT.

$\frac{114 \text{ AC. FT} \times 12}{0.6 \times 640 \text{ ACRES}} = 3.56$ INCHES OF RUN-OFF = STORi

$$Q P_2 = Q P_1 \left(1 - \frac{STORi}{9\frac{1}{2}}\right)$$

① STORi INCHES	② $\left(1 - \frac{STORi}{9\frac{1}{2}}\right)$	③ STORi AC. FT. $\frac{① \times 0.6 \times 640}{12}$	④ QPi-CFS ② × 840 CFS	⑤ ELVN FROM STORAGE CURVE USING COLUMN ③
2.50	0.737	80	619	759.6
3.44	0.638	110	536	761.4
3.56	0.63	114	529	761.38

COLUMNS ④ AND ⑤ ARE PLOTTED ON SHEET 8 AND WE OBTAIN PEAK OUTFLOW Q = 545 CFS.
AND MAXIMUM STAGE = 761.15
TOP OF DAM = EL. 761.
∴ THE DAM IS OVERTOPPED BY 0.15 FT. SAY 0.2± FT.

BREACH ANALYSIS - DOWNSTREAM FAILURE HAZARD

DAM WIDTH @ MID-HEIGHT = 266 FT (ORIGINAL PLANS)

W_b = 40% × 266 = 106.4, SAY = 105 FT.

Y_o = EL. 761.0 − EL. 739 = 22 FT.
(TO TOP OF DAM)

BREACH OUTFLOW $Q_b = \frac{8}{27} W_b \sqrt{g}\, Y_o^{3/2}$

$Q_b = \frac{8}{27} \times 105 \sqrt{32.2}\, (22.0)^{3/2}$

$Q_b =$ 18,200 CFS

PEAK FAILURE OUTFLOW Q_{P_1} = BREACH OUTFLOW Q_b, SINCE SPILLWAY IS PART OF BREACH ∴ Q_{P_1} = 18,200 CFS.

FAILURE FLOOD DEPTH IMMEDIATELY D/S OF THE DAM

$\cong .44\, Y_o = .44 \times 22 =$ 9.7 FT

PERFORM DOWNSTREAM ROUTING OF PEAK FAILURE OUTFLOW

SELECT A SECTION BB 920' DOWNSTREAM OF THE DAM.

USING MANNING'S EQUATION $Q = A \times \frac{1.486}{n} \times R^{2/3} \times S^{1/2}$

WHERE $n = 0.075$ ASSUMED, $S = 0.01$ ESTIMATED FROM USGS MAP

$\therefore Q = 1.98\, A R^{2/3}$

ELVN	A-SQ FT	P	R = A/P	$R^{2/3}$	Q CFS
7278	0	—	—	—	—
730	154	140	1.10	1.07	326
735	1279	306.6	4.17	2.59	6,560
740	3229	471	6.86	3.61	23,080

STAGE-AREA AND STAGE-DISCHARGE CURVES ARE PLOTTED 'BB'. FOR A PEAK FAILURE OUTFLOW OF 18,200 CFS, ELVN. = 739.1

AND SECTION BB ON SHEET 12 GIVES AN AREA = 2793 SQ FT.

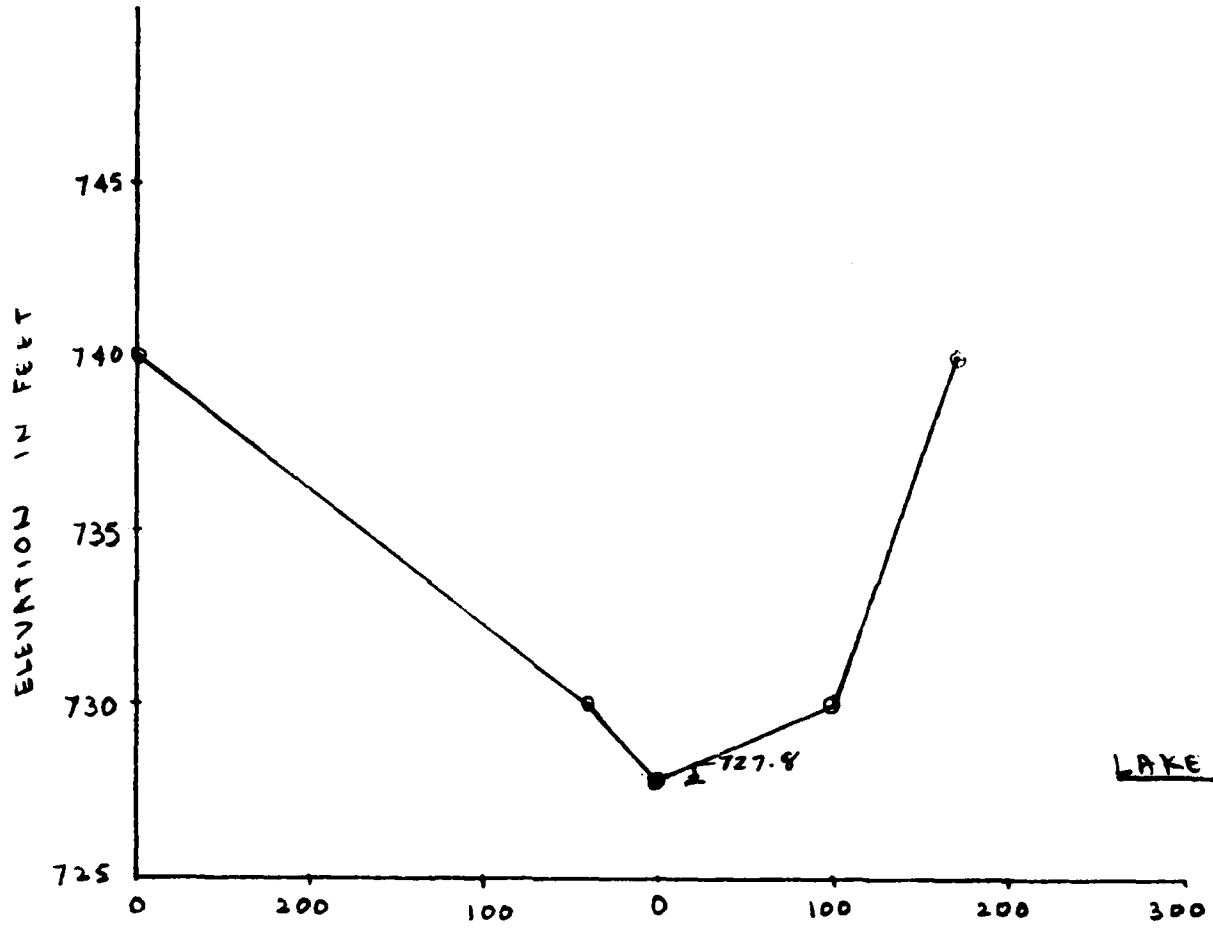
$\therefore$ VOLUME OF REACH $V_1 = \frac{920 \times 2793}{43,560} = 58.99 \cong 59$ AC.FT.

TRIAL $Q P_2 = Q P_1 \left(1 - \frac{V_1}{S}\right)$ WHERE S = TOTAL STORAGE TO TOP OF DAM EL. 761.0

$= 18,200 \left(1 - \frac{59}{183}\right) \cong 12,350$ CFS.

FOR THIS $Q P_2$, THE STAGE-DISCHARGE CURVE GIVES EL. 737.5 AND SECTION BB ON SHEET 12 GIVES AN AREA = 2126 SQ. FT.

$\therefore V_2 = \frac{920 \times 2126}{43,560} \cong 45$ AC.FT.

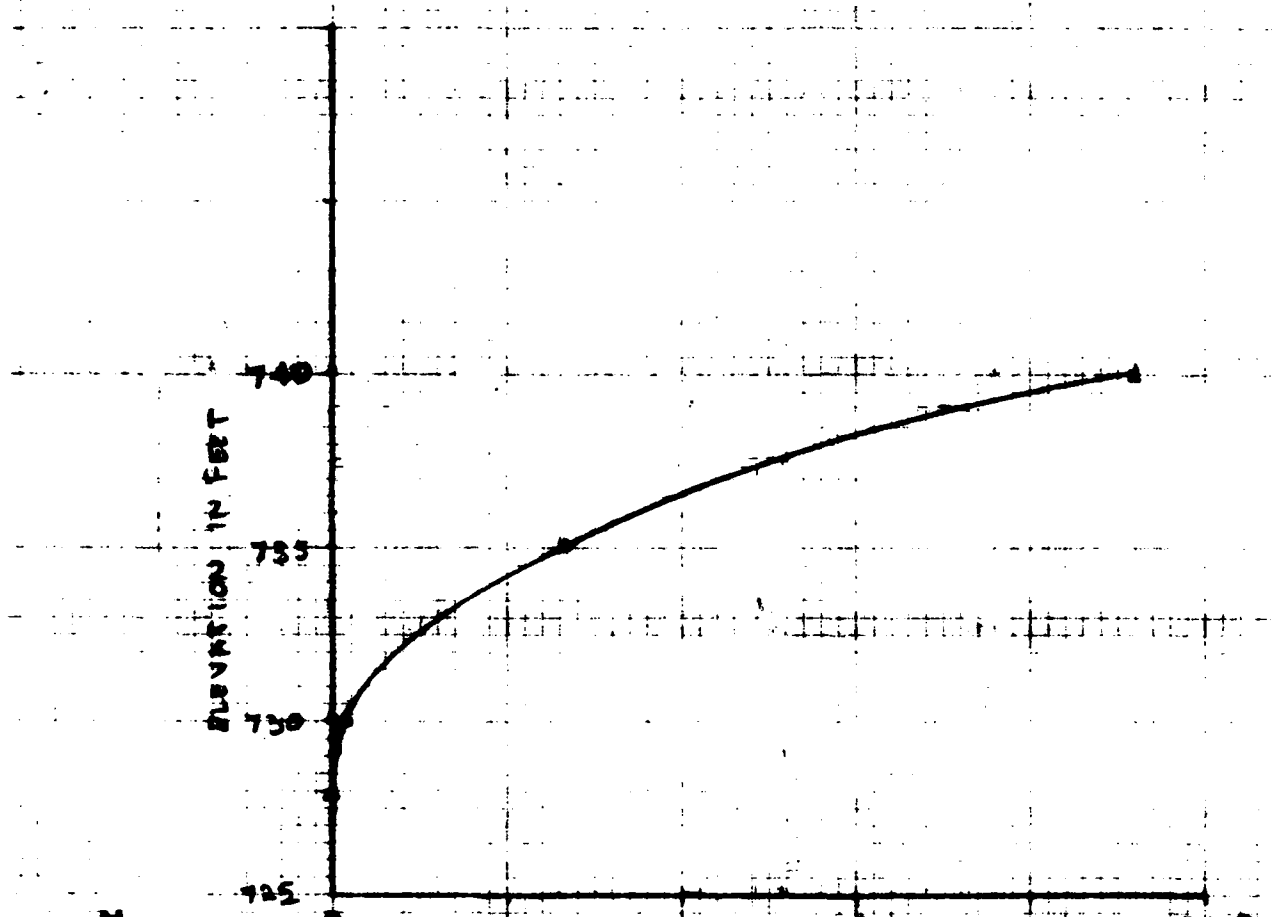


LAKE MARK DAM

LOOKING DOWNSTREAM

SECTION BB

420' DOWNSTREAM OF DAM



E-13

STAGE-DISCHARGE CURVE
LAKE MARK DAM
SECTION BB

RECOMPUTING, $Q_{P_2} = 18,200\left(1 - \frac{59+45}{2}\right)^{1.03}$

$\cong$ 13,000 CFS

AND THE STAGE-DISCHARGE CURVES GIVES EL. 737.7

FLOOD STAGE AT SECTION BB = EL. 737.7 - EL. 727.8
= 9.9 FT.

AREA OF CROSS-SECTION AT BB = 2210 SQ FT.

$\therefore$ VELOCITY $= \frac{Q}{A} = \frac{13,000}{2210} = 5.9$ FPS.

SELECT A SECTION A-A' 1000' DS OF BB

FROM USGS MAP, A STAGE-AREA CURVE IS PLOTTED

CHANNEL SLOPE $S = .00425$
ESTIMATED FROM USGS MAP.
FOR $n = .075$ ASSUMED.

$Q = A \times \frac{1.486}{n} \times R^{2/3} \times S^{1/2}$

$= A \times \frac{1.486}{.075} \times R^{2/3} \times (.00425)^{1/2}$

$= 1.29\, A R^{2/3}$

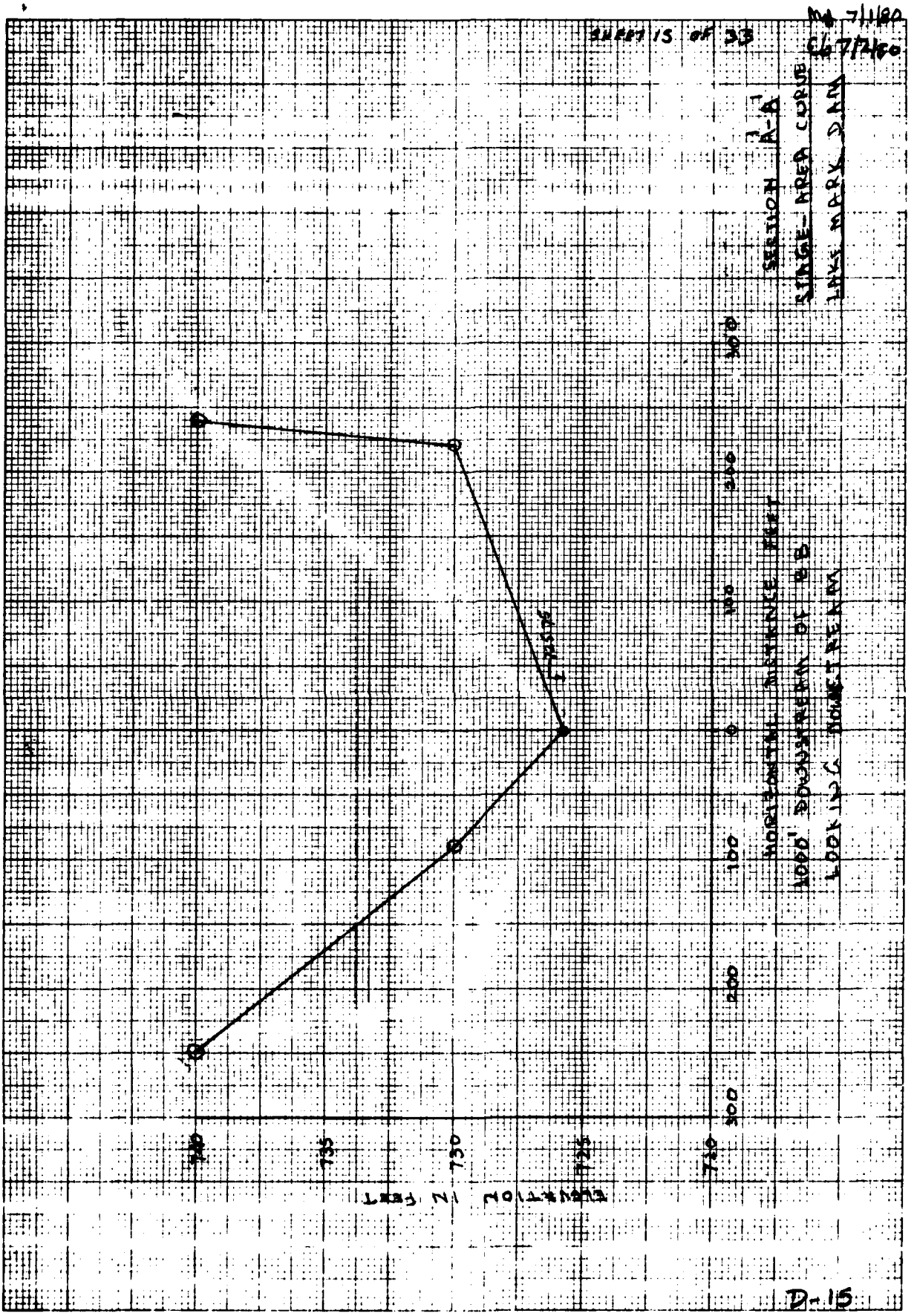
ELVN	A - FT^2	P	R = A/P	$R^{2/3}$	Q CFS
725.75	0	—	—	—	—
730	659	310.14	2.12	1.65	1405
735	2434	401.47	6.06	3.33	10,460
740	4659	492.80	9.45	4.47	26,900

STAGE-DISCHARGE CURVE IS PLOTTED (SHEET 16)
FOR Q_{P_1} = 13,000 CFS, THIS GIVES EL. 736
AND FOR EL. 736, AREA CURVE GIVES 2848 FT^2

$V_1 = \frac{1000 \times 2848}{43,560} = 65.4$ Ac Ft.

7/1/80
CL 7/2/80

SECTION A-A
SINGLE-AREA CURVE
LAKE MARK DAM

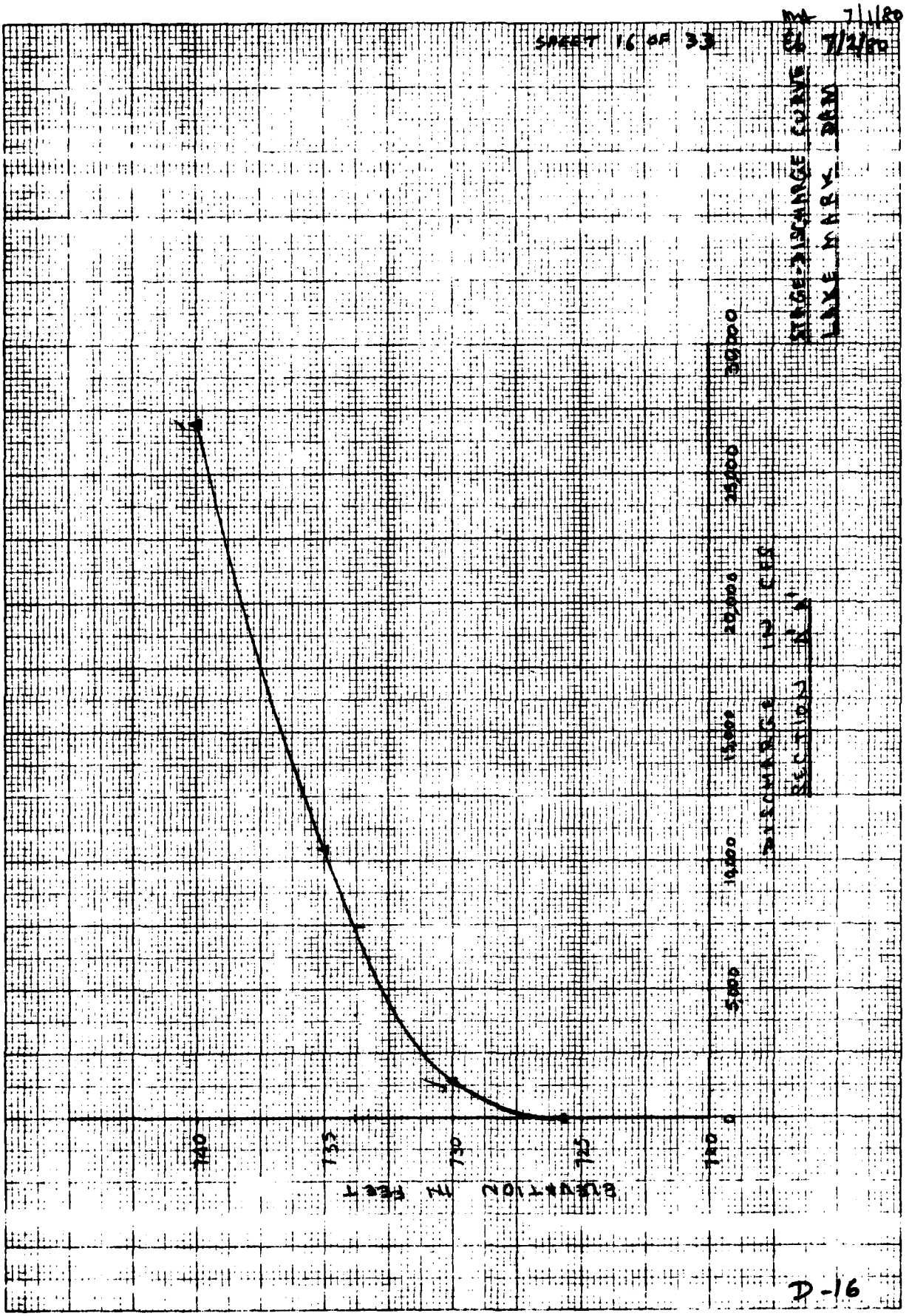


D-15

20 Squares to the Inch

7/1/80

STAGE-DISCHARGE CURVE
LAKE MARY DAM



D-16

20 Squares to the Inch

TRIAL $QP_2 = QP_1\left(1 - \frac{V_1}{S}\right)$ $S = 183 - \frac{59+45}{2} = 131$ AC.FT.

$= 13{,}000\left(1 - \frac{65.4}{131}\right) \simeq 6{,}500$ CFS

FOR THIS QP_2, THE STAGE-DISCHARGE CURVE ON SHEET 16 GIVES ELVN 733.5 AND STAGE AREA CURVE ON SHEET 15 GIVES AN AREA = 1857 SQ. FT.

$\therefore V_2 = \frac{1000 \times 1857}{43{,}560} = 42.6$ AC.FT.

RECOMPUTING $QP_2 = 13{,}000\left(1 - \frac{\frac{65.4+42.6}{2}}{131}\right) = 7650$ CFS

AND THE STAGE-DISCHARGE CURVE GIVES EL. 733.9
FLOOD DEPTH AT SECTION A'A' = EL. 733.9 - EL. 725.75
= 8.15 FT. SAY 8.2 FT.

AREA OF CROSS-SECTION AT A'A' FOR EL. 733.9 = 2000 SQ. FT.

$\therefore$ VELOCITY $= \frac{Q}{A} = \frac{7650}{2000} = 3.8$ FPS

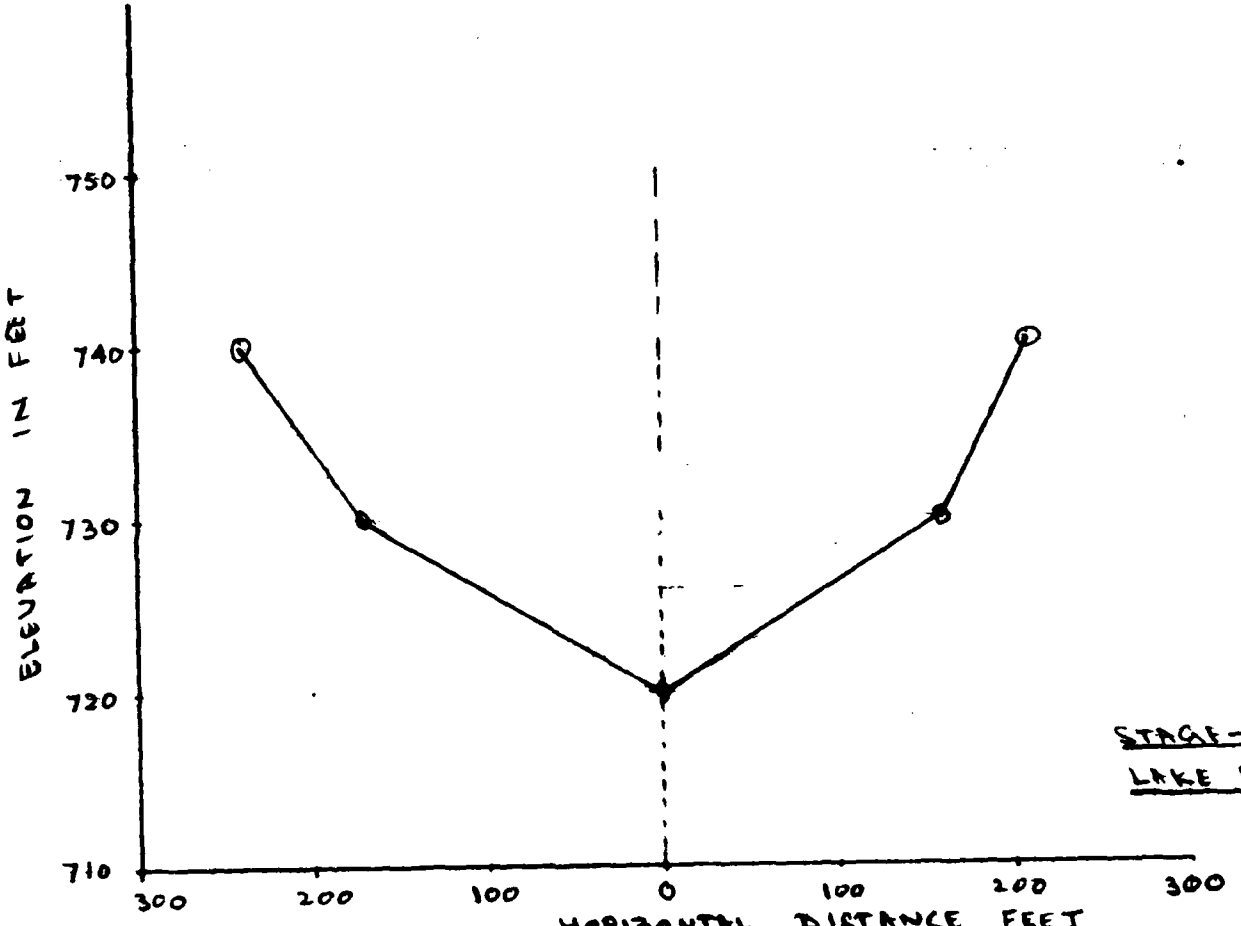
SELECT A SECTION AA - 880' DOWN STREAM OF A'A'

$QP_1 = 7650$ CFS, $S = 131 - \frac{65.4+42.6}{2} = 77$ AC. FT. REMAINING.

FROM USGS MAP, STAGE-AREA CURVE IS PLOTTED (SHEET 18)

$Q = A \times \frac{1.486}{n} R^{2/3} S^{\frac{1}{2}}$ $S = 0.0055$ ESTIMATED FROM USGS MAP

$= 1.47 A R^{2/3}$ $n = 0.075$ ASSUMED



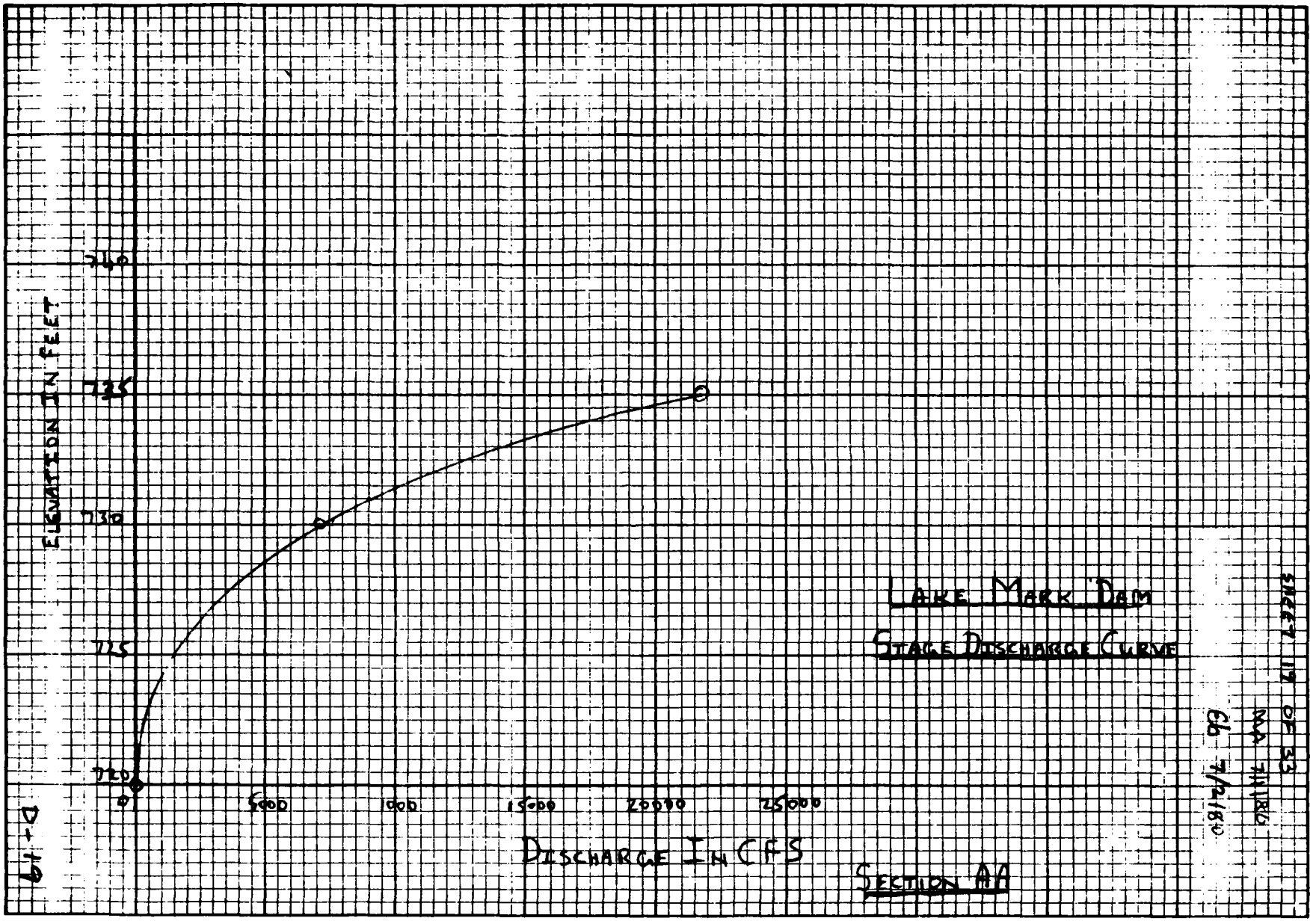
880' DOWNSTREAM OF SECTION A'A'
LOOKING DOWNSTREAM

SECTION A A

STAGE-AREA CURVE
LAKE MARK DAM

A-18

SHEET 18 OF 33
MA 7/1/80
CB 7/24/80



LAKE MARK DAM

STAGE DISCHARGE CURVE

SECTION AA

SHEET 17 OF 33

MAY 1980

GB 7/21/80

D-19

ELVD	A - FT²	P	R = A/P	R^2/3	Q CFS
720	0	—	—	—	—
730	1650	330.6	4.99	2.92	7085
735	3475	393	8.84	4.27	21,815
740	5550	452.3	12.27	5.31	43,320

A STAGE-DISCHARGE CURVE IS PLOTTED (SHEET 19) FOR $Q P_1 = 7650$ CFS. THIS CURVE GIVES EL. 730.2 AND FOR EL. 730.2, THE STAGE-AREA CURVE GIVES 1715 SQ FT.

$V_1 = \frac{880 \times 1715}{43,560} = 34.6$ AC. FT.

TRIAL $Q P_2 = Q P_1 \left(1 - \frac{V_1}{S}\right) = 7650 \left(1 - \frac{34.6}{77}\right) \cong 4200$ CFS

FOR THIS $Q P_2$, THE STAGE-DISCHARGE CURVE GIVES EL. 728.0 AND STAGE-AREA CURVE GIVES AN AREA = 1060 SQ. FT.

$\therefore V_2 = \frac{880 \times 1060}{43,560} = 21.4$ AC. FT.

RECOMPUTING $Q P_2 = 7650 \left(1 - \frac{34.6 - 12.1.4}{77}\right) \cong 4850$ CFS

AND THE STAGE-DISCHARGE CURVE GIVES EL. 728.5

FLOOD DEPTH AT SECTION AA = EL. 728.5 − EL. 720.0
= 8.5 FT

AREA OF CROSS-SECTION AT AA FOR EL. 728.5 ≅ 1200 SQ FT.

$\therefore$ VELOCITY $= \frac{Q}{A} = \frac{4850}{1200} = 4.0$ FPS.

SELECT A SECTION CC = 1300 DOWNSTREAM OF AA

QP_1 = 4850 CFS, S = 77-28 = 49 AC. FT REMAINING
FROM USGS MAP, STAGE-AREA CURVE IS PLOTTED (SHEET 22)

$Q = A \times \frac{1.486}{n} R^{2/3} S^{\frac{1}{2}}$ $S = 0.01$ ESTIMATED FROM USGS MAP
$n = 0.075$ ASSUMED

$= 1.98\ A\ R^{2/3}$

ELVN	A-FT^2	P	R	$R^{2/3}$	Q, CFS
710	0	—	—	—	—
717.5	506	138	3.67	2.38	2380
720	901	187	4.82	2.85	5085
722.5	1409	228	6.18	3.37	9395

A STAGE-DISCHARGE CURVE IS PLOTTED (SHEET 23)
FOR QP_1 = 4850 CFS. THIS CURVE GIVES EL. 719.9
AND FOR EL. 719.9, THE STAGE AREA CURVE GIVES AN AREA
= 881 SQ. FT.

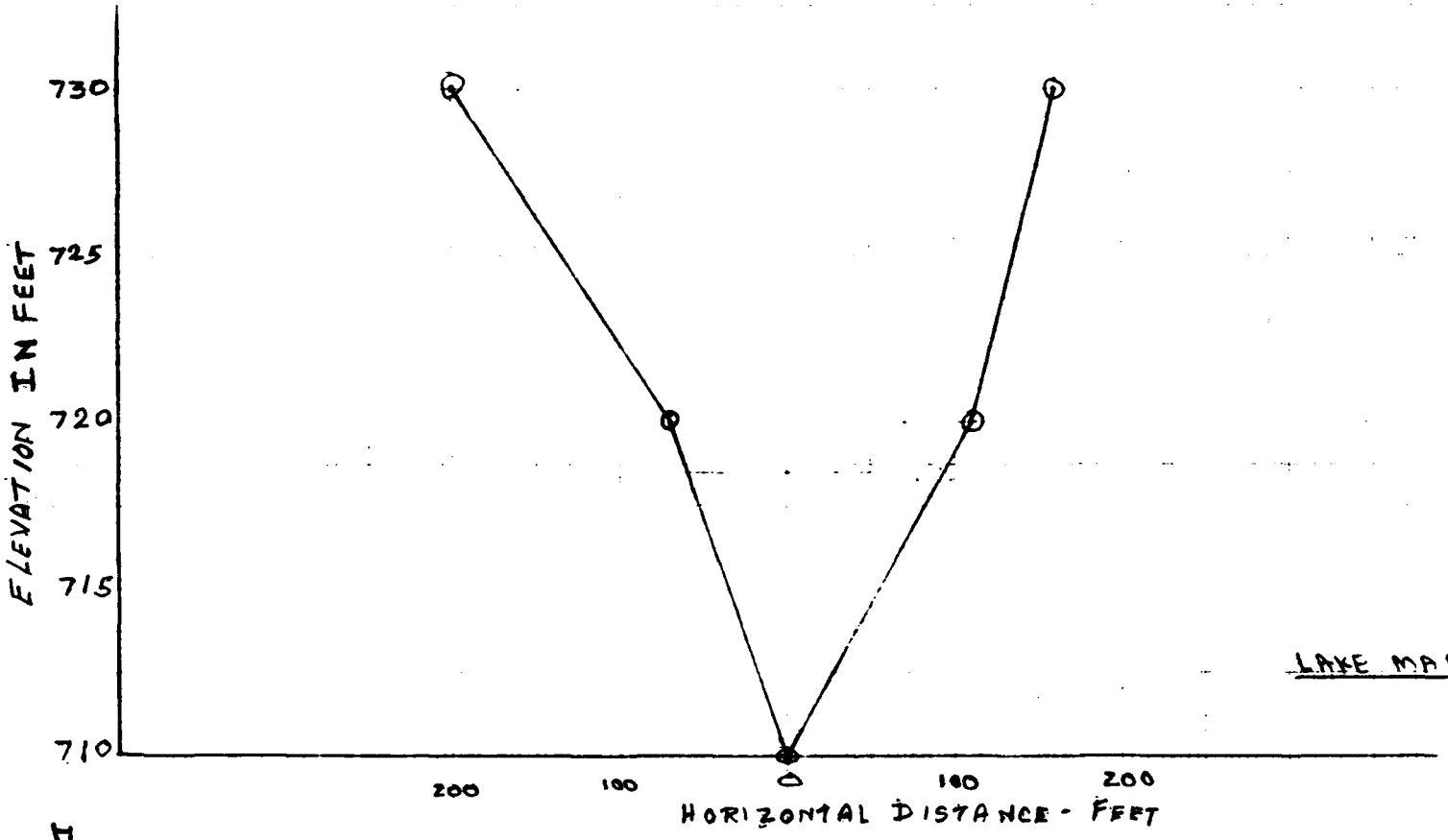
$V_1 = \frac{1300 \times 881}{43,560} = 26.3$ AC. FT

TRIAL $QP_2 = QP_1 \left(1 - \frac{V_1}{S}\right)$.

$= 4850 \left(1 - \frac{26.3}{49}\right) = 2250$ CFS

FOR THIS QP_2, THE STAGE-DISCHARGE CURVE GIVES
EL. 717.2
AND STAGE-AREA CURVE GIVES AN AREA = 468 SQ. FT.

$\therefore V_2 = \frac{1300 \times 468}{43,560} = 14$ AC. FT.



LAKE MARK LAM

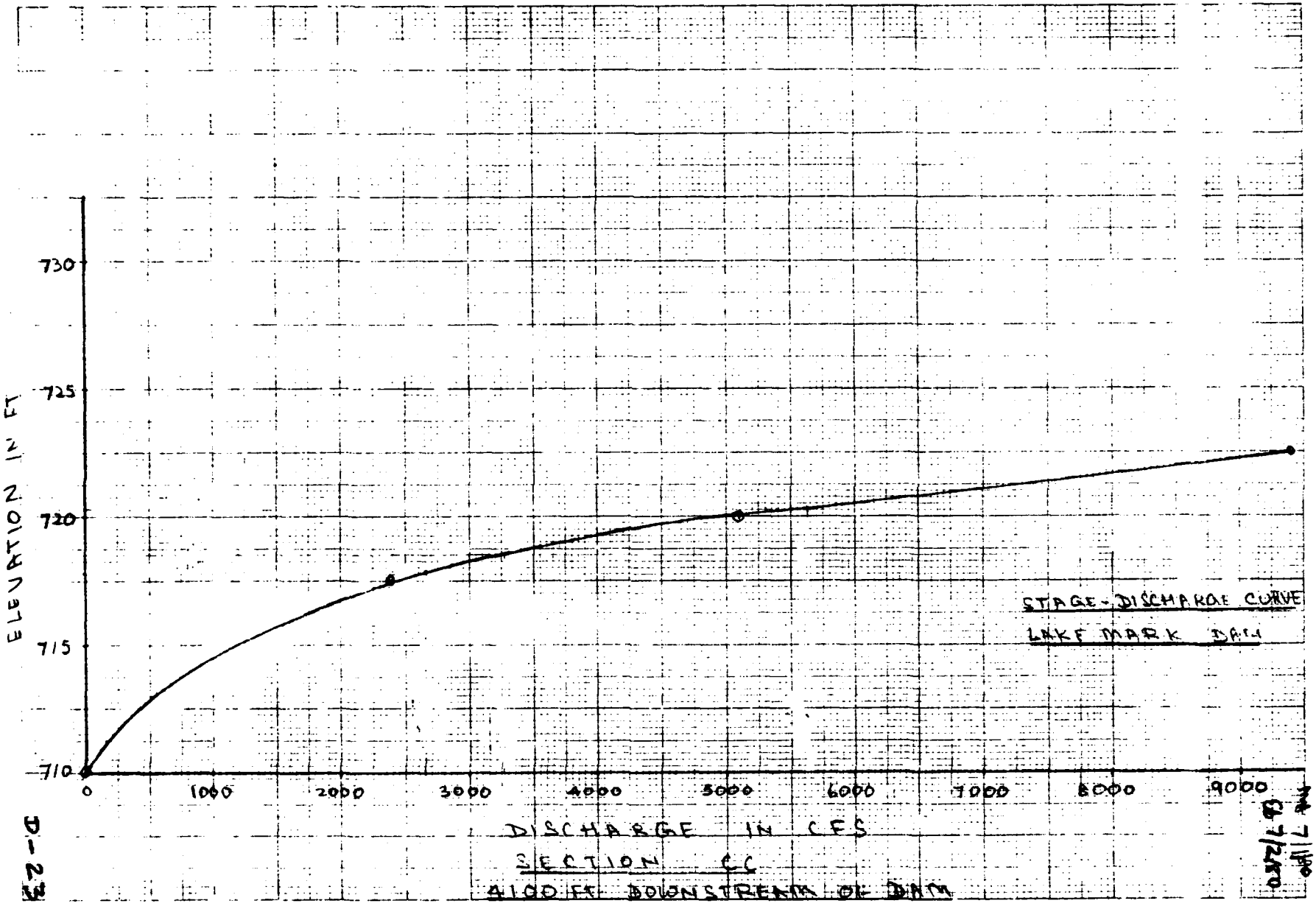
SECTION C-C
4100' DOWNSTREAM OF DAM
LOOKING DOWNSTREAM

D-22

SHEET 22 OF 33

NH 7/1/80

EB 7/2/80


730
725
720
715
710
ELEVATION IN FT
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
DISCHARGE IN CFS
SECTION CC
4100 FT DOWNSTREAM OF DAM
STAGE-DISCHARGE CURVE
LAKE MARK DAM

D-23

GA 7/1/80

RECOMPUTING $Q_{P_2} = 4850\left(1-\frac{26.3+14}{2}\right) \div 49 = 2850$ CFS

AND THE STAGE-DISCHARGE CURVE GIVES EL. 718

FLOOD DEPTH AT SECTION CC = EL. 718 - EL. 710 = 8 FT.

AREA OF CROSS SECTION AT CC FOR EL. 718 = 590 SQ. FT.

VELOCITY = $\frac{Q}{A} = \frac{2850}{590} = 4.8$ FPS

S REMAINING = $49 - \frac{26.3+14}{2} = 29$ AC. FT.
WHICH IS 16% OF INITIAL FLOOD VOLUME

SELECT ANOTHER SECTION DD - 1300' DOWN STREAM OF 'CC', $Q_{P_1} = 2850$ S = 29 AC. FT. FROM USGS MAP. STAGE AREA CURVE IS PLOTTED (SHEET 25)

$Q = A \times \frac{1.486}{n} R^{2/3} S^{\frac{1}{2}}$
$= 2.46\, AR^{2/3}$

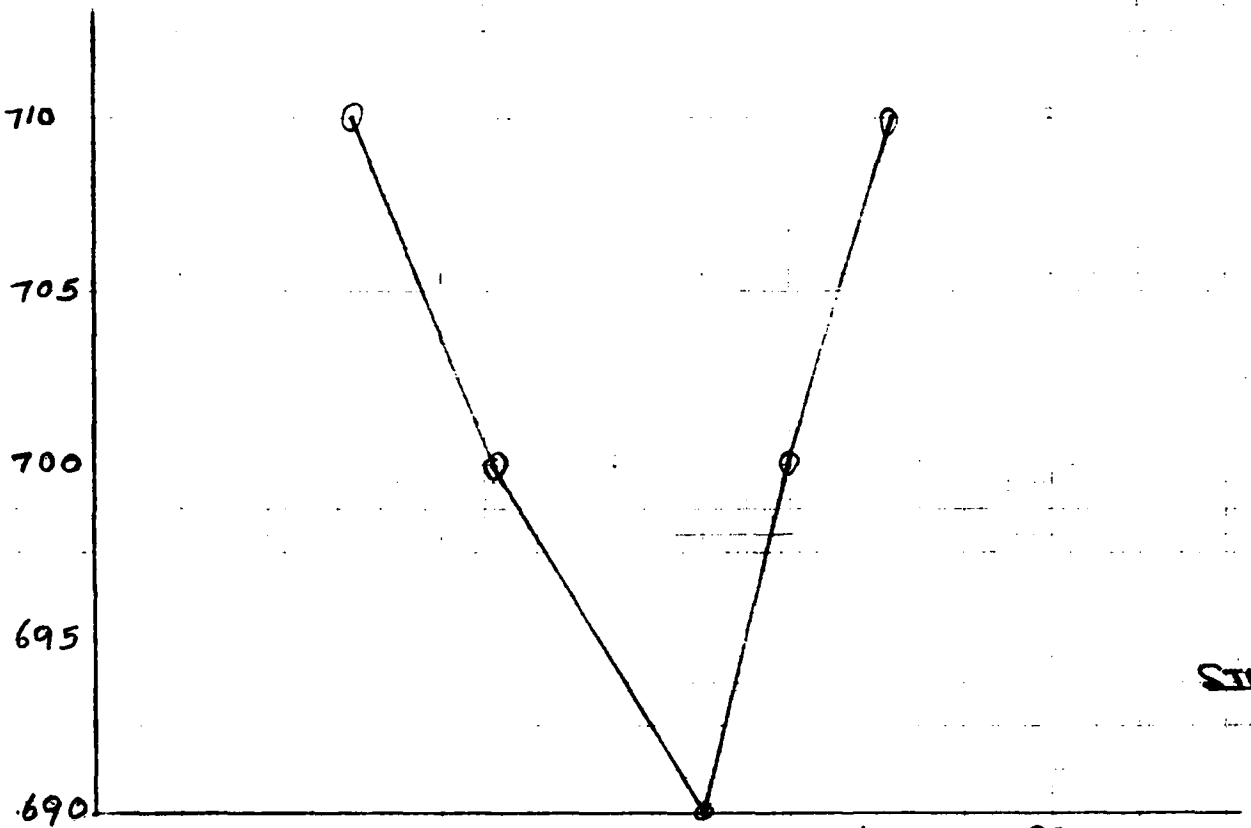
S = 0.0154 ESTIMATED FROM USGS MAP
n = 0.075 ASSUMED

EL.	A-FT²	P	R	R^2/3	Q-CFS
690	0	—	—	—	—
695	212	86	2.47	1.83	955
700	857	172	4.98	2.92	6155

A STAGE-DISCHARGE CURVE IS PLOTTED (SHEET-26)
FOR $Q_{P_1} = 2850$ CFS, THIS CURVE GIVES EL. 697.7

AND FOR EL. 697.7, THE STAGE AREA CURVE GIVES
= 500 SQ FT

$V_{II} = \frac{1300 \times 500}{43,560} = 15$ AC. FT.



SECTION D-D

1300' D/S OF C-C

5400' D/S OF DAM

STAGE - AREA CURVE

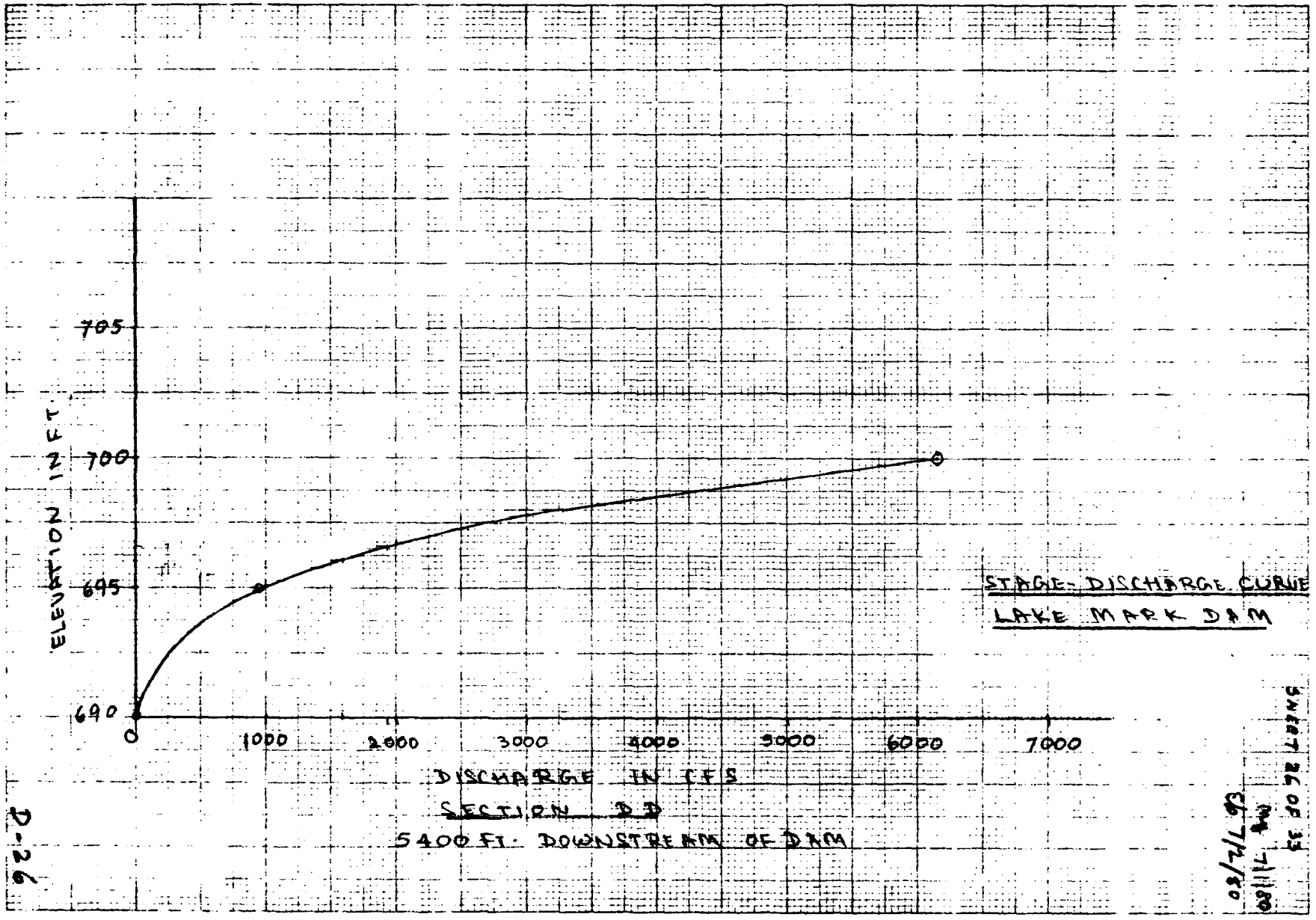
LAKE MARK SAM

SHEET 25 OF 33

MWT 7/1/80

GB 7/2/80

D-25



D-26

SHEET 25 OF 33
7/1/80
7/2/80

TRIAL $Q P_2 = Q P_1 (1 - \frac{V_1}{S})$
$= 2850 (1 - \frac{15}{29}) = 1375$ CFS

FOR THIS $Q P_2$, THE STAGE-DISCHARGE CURVE GIVES EL. 695.75 AND STAGE-AREA CURVE GIVES AN AREA = 282 SQ.FT.

$\therefore V_2 = \frac{1300 \times 282}{43,560} = 8.4$ Ac.Ft.

RECOMPUTING $Q P_2 = 2850 (1 - \frac{15+8.4}{29}) = 1700$ CFS

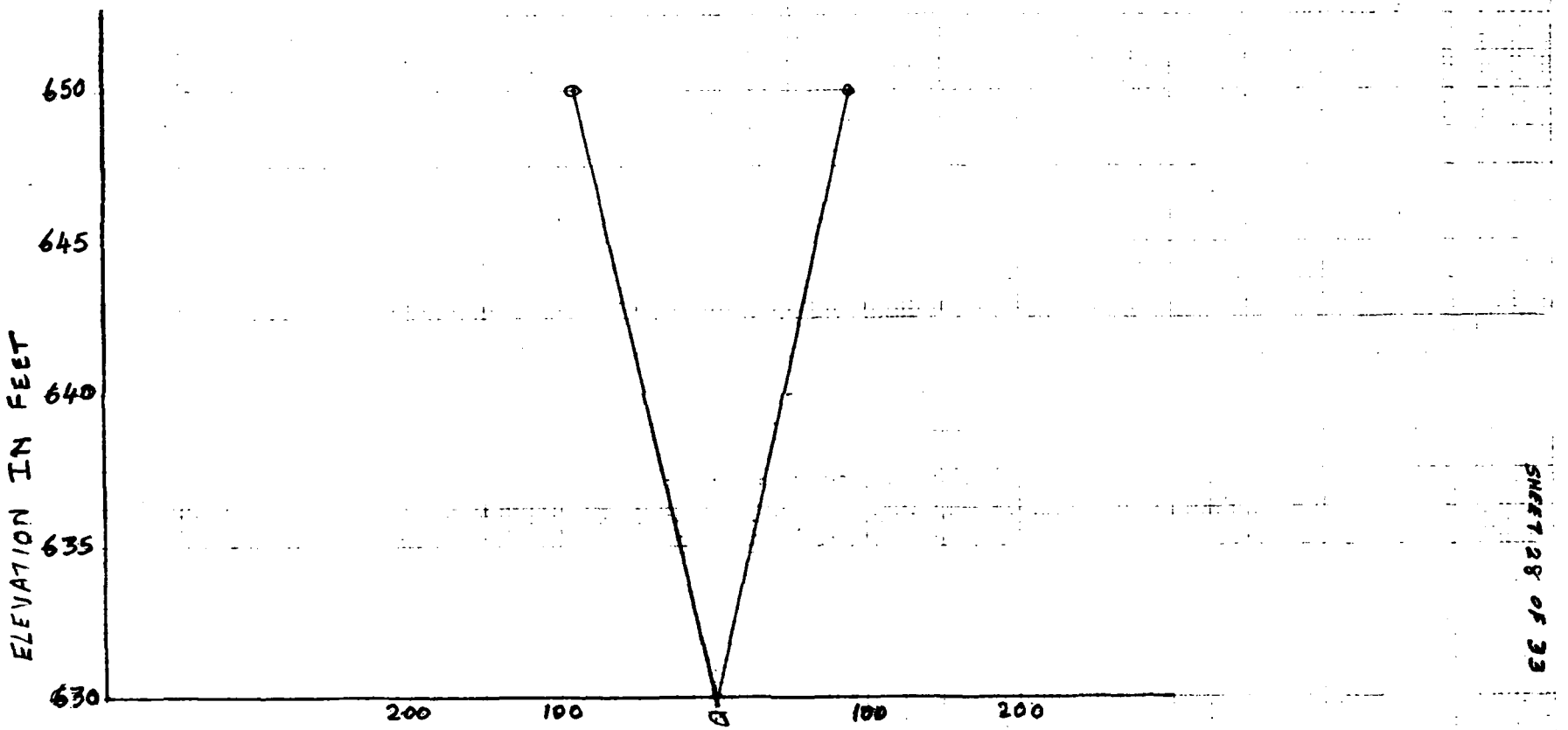
AND THE STAGE-DISCHARGE CURVE GIVES EL. 696.3
FLOOD DEPTH AT SECTION DD = EL. 696.3 - EL. 690 = 6.3 FT.
AREA OF CROSS-SECTION AT DD FOR EL. 696.3 = 325 SQ.FT.

VELOCITY $= \frac{Q}{A} = \frac{1700}{325} = 5.2$ FPS

SELECT ANOTHER SECTION EE — 1900' DOWNSTREAM OF DD $Q P_1 = 1700$ CFS, $S = 29 - \frac{15+8.4}{2} = 17.3$ Ac.Ft.

FROM USGS MAP STAGE AREA CURVE IS PLOTTED
$Q = A \times \frac{1.486}{n} \times R^{2/3} \times S^{\frac{1}{2}}$ $S = 0.0316$ ESTIMATED FROM USGS MAP
$= 3.53 A R^{2/3}$ $n = 0.045$ ASSUMED

EL	A - FT²	P	R	$R^{2/3}$	Q - CFS
630	0	—	—	—	—
635	120	49	2.45	1.82	770
637.5	259	70	3.70	2.39	2185
639.0	369	83	4.45	2.70	3520



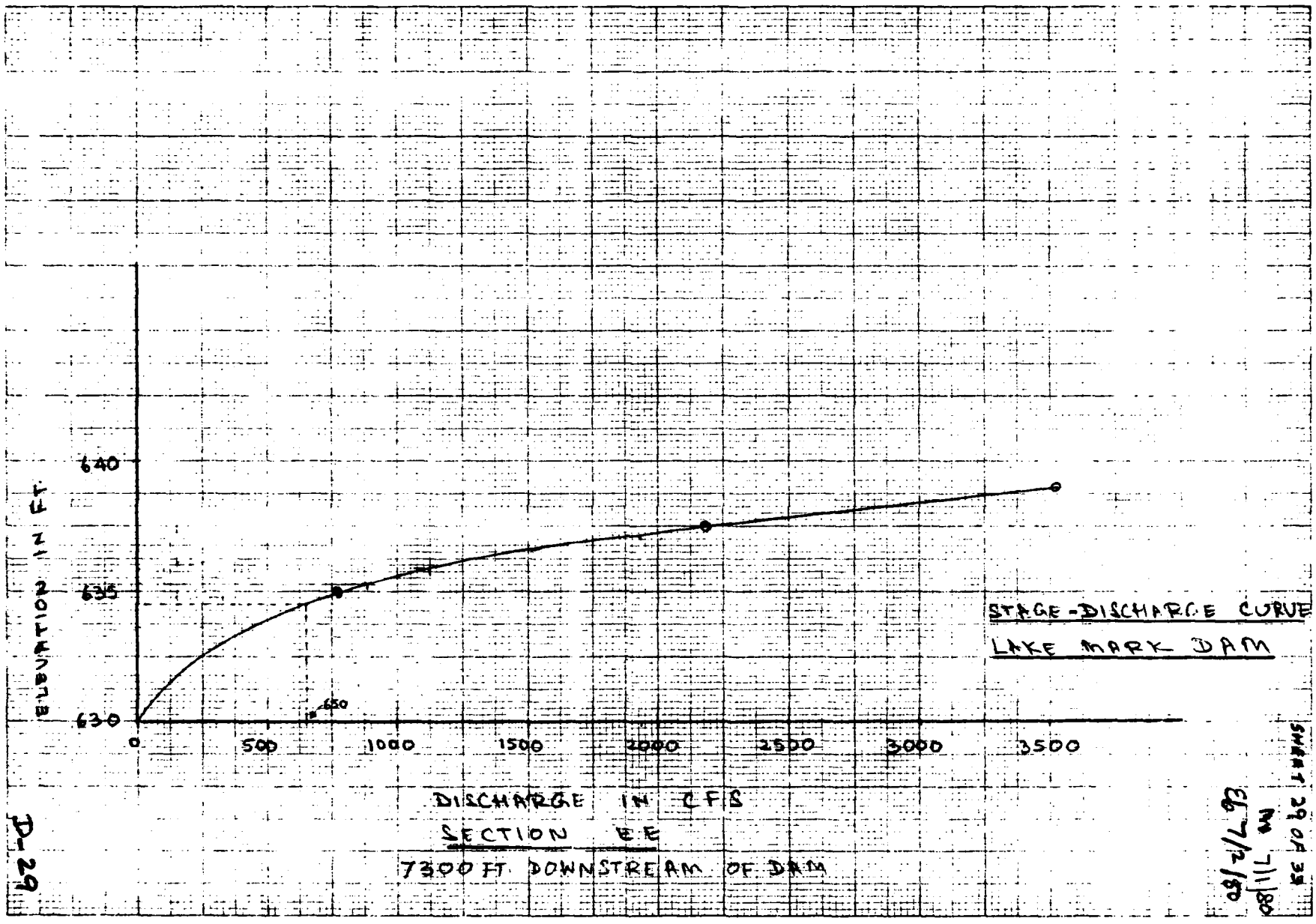
SECTION E-E
7300' D.S OF DAM
1900' DS OF D-D

STAGE-AREA CURVE
LAKE MARY DAM

SHEET 28 OF 33

D-28

6/7/80 MW 1180

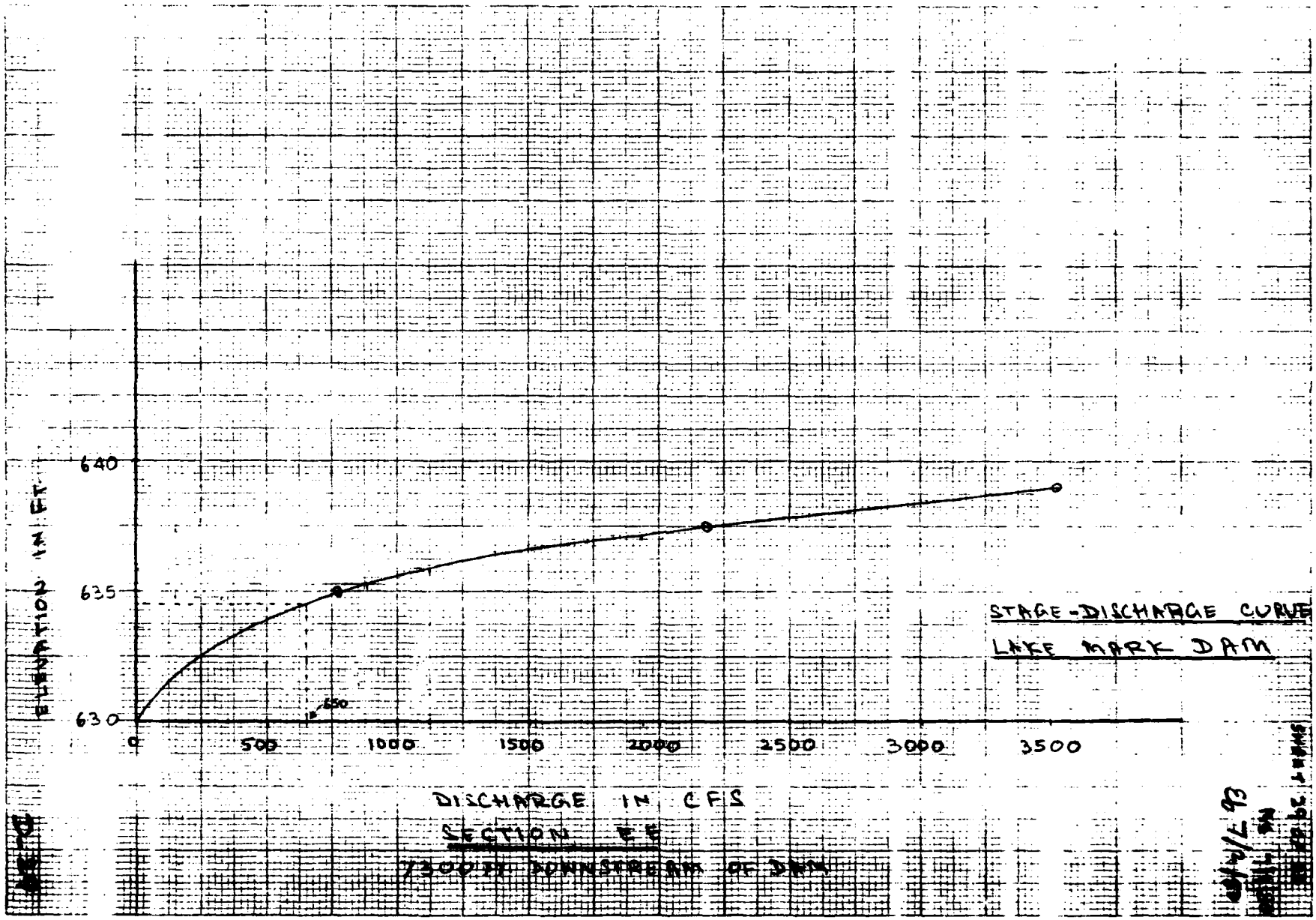


D-29

SHEET 29 OF 33

EB 7/2/80

MM 7/11/80


ELEVATION IN FT.
640
635
630
0
500
1000
1500
2000
2500
3000
3500
650
DISCHARGE IN CFS
SECTION E-E
7300 FT. DOWNSTREAM OF DAM
STAGE-DISCHARGE CURVE
LAKE MARK DAM

A STAGE-DISCHARGE CURVE IS PLOTTED
FOR QP_1 = 1700 CFS, THIS CURVE GIVES EL. 636.9
AND FOR EL. 636.9, THE STAGE AREA CURVE GIVES AN
AREA, 220 SQ. FT.

$$V_1 = \frac{1900 \times 220}{43,560} = 9.6 \text{ AC. FT.}$$

TRIAL $QP_2 = QP_1 \left(1 - \frac{V_1}{S}\right)$

$$= 1700 \left(1 - \frac{9.6}{17.3}\right) = 750 \text{ CFS}$$

FOR THIS QP_2, THE STAGE-DISCHARGE CURVE GIVES
EL. 634.9 AND STAGE-AREA CURVE GIVES
≅ 110 SQ. FT.

$$\therefore V_2 = \frac{1900 \times 110}{43,560} = 4.8 \text{ AC. FT.}$$

RECOMPUTING $QP_2 = 1700 \left(1 - \frac{9.6+4.8}{2} \Big/ 17.3\right) \cong 1000 \text{ CFS}$

AND THE STAGE-DISCHARGE CURVE GIVES EL. 635.6
∴ FLOOD DEPTH AT SECTION EE = EL. 635.6 − EL. 630 = 5.6 FT

AREA OF CROSS SECTION AT EE FOR EL 635.6 = 142 SQ FT

$$\therefore \text{VELOCITY} = \frac{Q}{A} = \frac{1000}{142} = 7 \text{ FPS}$$

S REMAINING 17.3 − 7.2 ≅ 10 AC. FT.
WHICH IS 6% OF THE INITIAL FLOOD VOLUME

FAILURE HAZARD POTENTIAL

SUMMARY OF BREACH ANALYSIS RESULTS—

LOCATION	DISTANCE FT	Q CFS	FLOOD STAGE	FLOOD DEPTH FT	VEL. FPS	FLOOD VOLUME REMAINING AC. FT.
DAM	0	18,200	748.7	9.7	—	183
BB	920	13,000	737.7	9.9	5.9	131
A' A'	1920	7,650	733.9	8.2	3.8	77
AA	2800	4,850	728.5	8.5	4.0	49
CC	4100	2,850	718.1	8.1	4.8	29
DD	5400	1,700	696.3	6.3	5.2	17
EE	7300	1,000	635.6	5.6	7	10

WITHOUT FURTHER FLOOD ROUTING, THE FOLLOWING ANALYSIS IS PRESENTED:

THE SUMMARY TABLE SHOWS THAT THE FLOOD VOLUME OF 183 AC.FT AT DAM BREACH REDUCES TO 10 AC. FT. 7300' DOWNSTREAM. A STREAM LENGTH OF 4300± FT IS AVAILABLE UPTO ROUTE 190 TO ATTENUATE THE REMAINING FLOOD VOLUME OF 10 AC.FT. AN EXAMINATION OF THE USGS MAP INDICATES THAT MOST OF THE REMAINING STREAM CHANNEL IS NARROW AND STEEP. HOWEVER, ASSUMING AN AVERAGE STREAM CROSS-SECTION OF 142 SQ.FT (AS AT SECTION EE) FOR THE ENTIRE 4300 FT, THE FLOOD STORAGE VOLUME OF 10 AC.FT. AT SECTION EE CAN BE EXPECTED TO BE ATTENUATED IN THE CHANNEL PRIOR TO REACHING ROUTE 190.

HOWEVER, THE SUMMARY TABLE INDICATES THE DEPTH OF FLOOD TO BE 5.6' HAVING A HIGH VELOCITY OF 7 FPS AT SECTION EE. ASSUMING AVERAGE CONDITIONS. IT IS ESTIMATED THAT THE DEPTH OF FLOOD WATER PRIOR TO REACHING ROUTE 190 CULVERT TO BE IN THE NEIGHBORHOOD OF 4.5± FT, HAVING A VELOCITY OF 7± FPS FOR AN ESTIMATED PEAK FLOW OF 650± CFS. FROM THE USGS MAP THE CHANNEL BED ELEVATION IS 522± AND THEREFORE THE FLOOD STAGE IS EXPECTED TO BE 526.5±. SIMILARLY, FOR A PRE FAILURE FLOW OF 440 CFS, THE FLOOD STAGE IS EXPECTED TO BE 525.5±. FROM FIELD OBSERVATION, TWO BUILDINGS LOCATED ADJACENT TO THE BROOK NORTH OF ROUTE 190 HAVE THEIR FIRST FLOOR ELEVATIONS 3.8± FT ABOVE THE CHANNEL BED. THUS, THESE BUILDINGS, ONE OF WHICH IS A HOUSE, ARE EXPECTED TO BE FLOODED BY 0.7± FT. OF WATER DUE TO DAM BREACH. ADDITIONALLY, ROUTE 190 WHICH IS OBSERVED TO CARRY SUBSTANTIAL TRAFFIC COULD BE IMPACTED.

FURTHER, IT SHOULD BE POINTED OUT THAT A SMALL STONE DAM (5± FT. HIGH) LOCATED 500± FT. ABOVE ROUTE 190 COULD BE BREACHED AND THE FLOODING SITUATION DESCRIBED ABOVE COULD BE FURTHER AGGRAVATED BY THIS DAM.
ADDITIONALLY, AT LEAST ONE BUILDING CONTAINING BUSINESSES SOUTH OF ROUTE 190 CAN REASONABLY BE EXPECTED TO HAVE FLOOD HAZARD (SECONDARY IMPACT).
ALSO, THE 3 FOOT CONCRETE CULVERT ON DIAMOND LEDGE ROAD 1000± FT. DOWNSTREAM OF THE DAM COULD WASHOUT SINCE THE FLOOD DEPTH IS ESTIMATED TO BE MORE THAN 4 FT. WITH HIGH VELOCITY.

THUS IT CAN BE SEEN FROM THE ABOVE DISCUSSION. THAT A HAZARD POTENTIAL OF SIGNIFICANT MAGNITUDE IS CONSIDERED LIKELY.

SUMMARY- HYDRAULIC/HYDROLOGIC COMPUTATIONS

TEST FLOOD PEAK INFLOW ½PMF	840 CFS
PERFORMANCE AT PEAK FLOOD CONDITIONS:	
PEAK INFLOW	840 CFS
PEAK OUTFLOW	545 CFS
SPILLWAY CAPACITY TO TOP OF DAM (EL.761)	440 CFS
SPILLWAY CAPACITY TO TOP OF DAM % OF PEAK OUTFLOW	81%
SPILLWAY CAPACITY TO TEST FLOOD ELVN.(EL.761.15)	460 CFS
SPILLWAY CAPACITY TO TEST FLOOD ELVN.%OF PEAK OUTFLOW	84%
TEST FLOOD-DAM OVERTOPPED:	
MAXIMUM POOL ELEVATION	761.2±
MAXIMUM SURCHARGE HEIGHT ABOVE SPILLWAY CREST	6.2±FT
NON-OVERFLOW SECTION OF THE DAM OVERTOPPED BY	0.2±FT
DOWNSTREAM FAILURE CONDITIONS:	
TOTAL PEAK FAILURE OUTFLOW	18,200 CFS
HEIGHT AT TIME OF FAILURE	9.7 FT
CONDITIONS AT INITIAL IMPACT AREA:(CHANNEL BED EL.522+)	
ESTIMATED STAGE BEFORE FAILURE WITH 440 CFS	EL.525.5±
ESTIMATED STAGE AFTER FAILURE WITH 650±CFS	EL.526.5±
ESTIMATED RAISE IN STAGE AFTER FAILURE ΔY_1	1±

PRELIMINARY GUIDANCE

FOR ESTIMATING

MAXIMUM PROBABLE DISCHARGES

IN

PHASE I DAM SAFETY

INVESTIGATIONS

New England Division
Corps of Engineers

March 1978

MAXIMUM PROBABLE FLOOD INFLOWS
NED RESERVOIRS

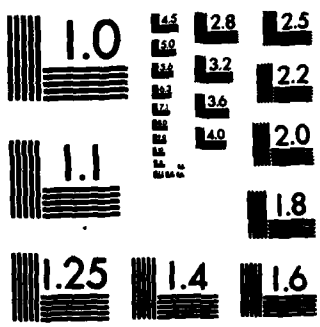
	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,600	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	MacDowell	36,300	44.0	825

MAXIMUM PROBABLE FLOWS BASED ON TWICE THE STANDARD PROJECT FLOOD (Flat and Coastal Areas)

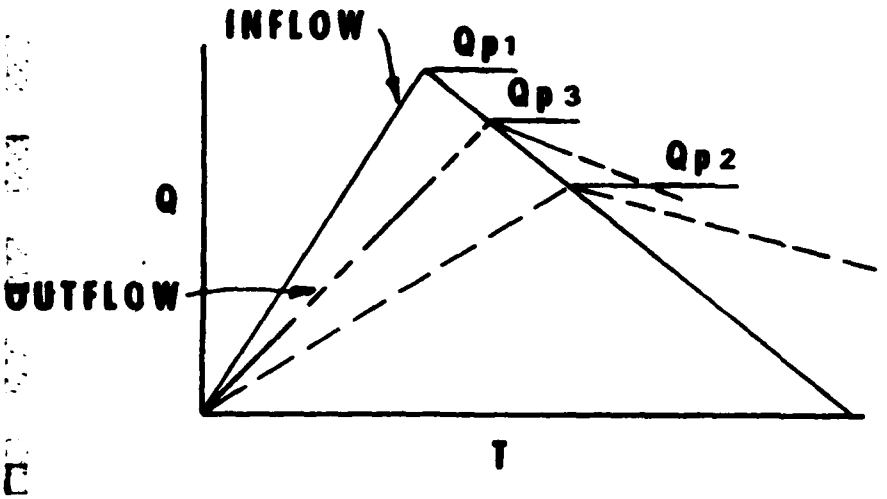
	River	SPF (cfs)	D.A. (sq. mi.)	MPF (cfs/sq. mi.)
1.	Pawtuxet River	19,000	200	190
2.	Mill River (R.I.)	8,500	34	500
3.	Peters River (R.I.)	3,200	13	490
4.	Kettle Brook	8,000	30	530
5.	Sudbury River.	11,700	86	270
6.	Indian Brook (Hopk.)	1,000	5.9	340
7.	Charles River.	6,000	184	65
8.	Blackstone River.	43,000	416	200
9.	Quinebaug River	55,000	331	330

AD-A144 157 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 2/2
LAKE MARK DAM (CT 003.. (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV AUG 80

UNCLASSIFIED F/G 13/13 NL



ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



STEP 1: Determine Peak Inflow (Qp_1) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Qp_1".

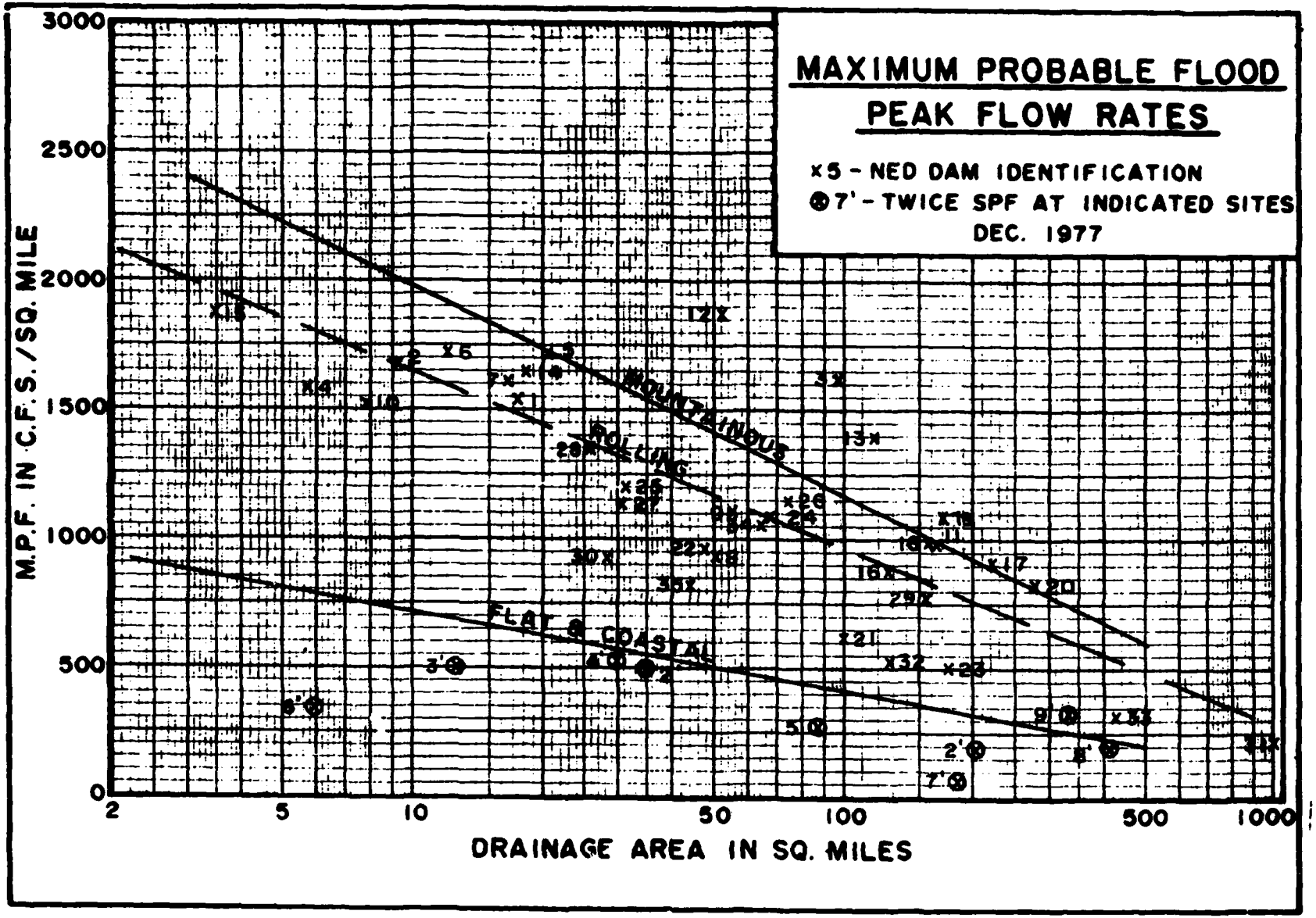
b. Determine Volume of Surcharge ($STOR_1$) In Inches of Runoff.

c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore:

$$Qp_2 = Qp_1 \times \left(1 - \frac{STOR_1}{19}\right)$$

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Average "$STOR_1$" and "$STOR_2$" and Determine Average Surcharge and Resulting Peak Outflow "Qp_3".


MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
×5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITES
DEC. 1977
M.P.F. IN C.F.S./SQ. MILE
DRAINAGE AREA IN SQ. MILES
3000
2500
2000
1500
1000
500
0
2
5
10
50
100
500
1000
MOUNTAINOUS
ROLLING
FLAT & COASTAL

SURCHARGE STORAGE ROUTING SUPPLEMENT

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Avg "$STOR_1$" and "$STOR_2$" and Compute "Qp_3".

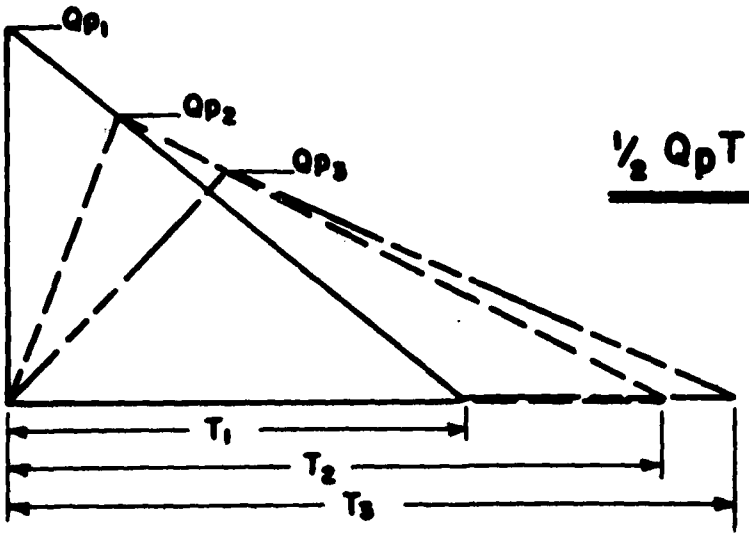
c. If Surcharge Height for Qp_3 and "$STOR_{AVG}$" agree O.K. If Not:

STEP 4: a. Determine Surcharge Height and "$STOR_3$" To Pass "Qp_3"

b. Avg. "Old $STOR_{AVG}$" and "$STOR_3$" and Compute "Qp_4"

c. Surcharge Height for Qp_4 and "New $STOR_{Avg}$" should Agree closely

"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$\frac{1}{2} Q_p T = 12 S$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Q_{p_1} = \frac{8}{27} W_b \sqrt{g} Y_o^{\frac{3}{2}}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Q_{p_2}(\text{TRIAL}) = Q_{p_1}\left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Q_{p_2} = Q_{p_1}\left(1 - \frac{V_{1\&2}}{S}\right)$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

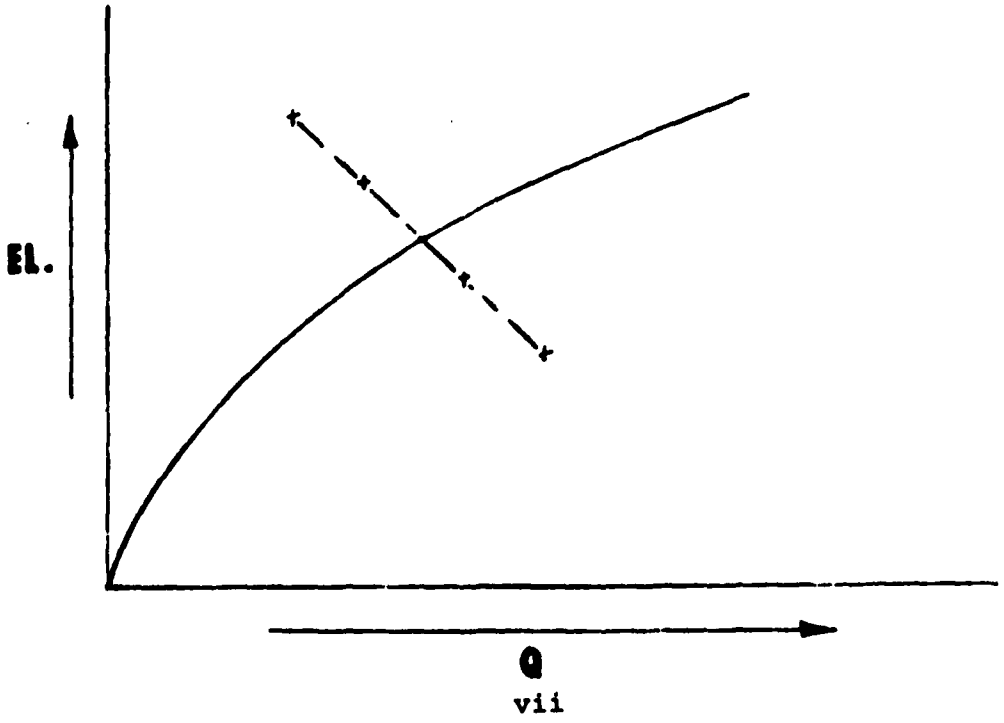
SURCHARGE STORAGE ROUTING ALTERNATE

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR}{19}\right)$$

$$Q_{p2} = Q_{p1} - Q_{p1}\left(\frac{STOR}{19}\right)$$

FOR KNOWN Q_{p1} AND 19'' R.O.

Q_{p2} STOR EL.



APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST.	STATE	COUNTY	CONGR DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY | MO | YR
CT	337	NED	CT	013	02				LAKE MARK DAM	4200.1	7221.0	01SEP80

POPULAR NAME	NAME OF IMPOUNDMENT
	LAKE MARK

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	10	DIAMOND LEDGE BROOK	WEST STAFFORD	2	1000

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
MEPG	1957	R	23	22	185	75	NED	N	N	N	N	

REMARKS
22=CERTIFICATE OF APPROVAL 1972

D/S HAS	SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO.	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
2	580	U	10		440											

OWNER	ENGINEERING BY	CONSTRUCTION BY
MICHAEL MOLITONIS	BUCK AND BUCK	OWNER

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
CT ENVIRON PROTECT	CT ENVIRON PROTECT	CT ENVIRON PROTECT	CT ENVIRON PROTECT

INSPECTION BY	INSPECTION DATE DAY | MO | YR	AUTHORITY FOR INSPECTION
CAHN ENGINEERS INC	31MAR80	PL93-367

REMARKS

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
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	3. RECIPIENT'S CATALOG NUMBER:
4. TITLE (and Subtitle): Lake Mark Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS	5. TYPE OF REPORT & PERIOD COVERED: INSPECTION REPORT
	6. PERFORMING ORG. REPORT NUMBER:
7. AUTHOR(s): U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION	8. CONTRACT OR GRANT NUMBER(s):
9. PERFORMING ORGANIZATION NAME AND ADDRESS:	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS:
11. CONTROLLING OFFICE NAME AND ADDRESS: DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254	12. REPORT DATE: August 1980 13. NUMBER OF PAGES: 60
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16. DISTRIBUTION STATEMENT (of this Report)

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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

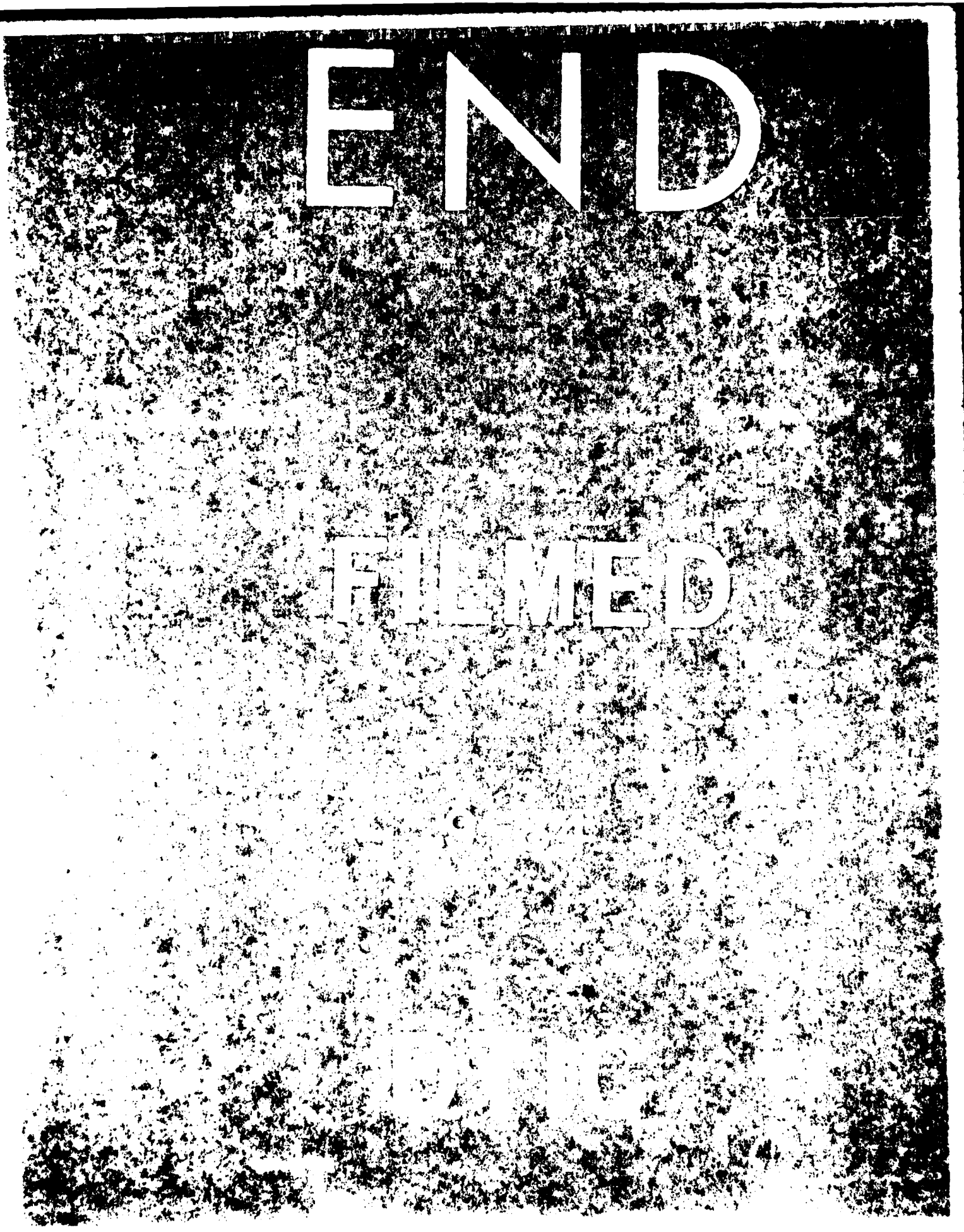
DAMS, INSPECTION, DAM SAFETY,

Thames River Basin
Stafford, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam consists of an earth embankment with a concrete corewall and a concrete spillway. The embankment is 580 feet long, has a maximum storage capacity of 185-acre-feet, and is 22 feet in height above the streambed of Diamond Ledge Brook at the toe of the dam. Based upon the visual inspection at the site and past performance of the dam, the project is judged to be in fair condition. Lake Mark Dam is classified as a significant hazard, small size dam. The test flood range to be considered is from the one hundred year flood to one-half the PMF.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE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